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## **BULGARIA**

### **Reimbursable Advisory Services Program on Innovation**

# **Input for Bulgaria's Research and Innovation Strategies for Smart Specialization: Developing the Digital Agenda**

*Technical Note*

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Private and Financial Sectors Development Department  
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*The views expressed in this document are solely those of the authors and may not, under any circumstances, be regarded as representing an official position of the Ministry of Economy and Energy*

## **CURRENCY AND EQUIVALENT UNITS**

(as of June 28, 2013)

Currency Unit	=	BGN (Bulgarian Lev)
US\$1	=	1.49528 BGN
1 BGN	=	US\$0.66

## **WEIGHTS AND MEASURES**

**Metric System**

## **ABBREVIATIONS AND ACRONYMS**

3S	Smart Specialization Strategy
BPO	Business Process Outsourcing
DAE	Digital Agenda for Europe
CCI	Cultural and Creative Industries
CEF	Connecting Europe Facility
CEO	Chief Executive Officer
CoM	Council of Ministers
CRC	Communications Regulation Commission
DMS	Destination Management System
DSL	Digital Subscriber Lines
EC	European Commission
EU	European Union
FDI	Foreign Direct Investment
FP7	The Seventh Framework Programme (2007-2013)
GDP	Gross Domestic Product
GoB	Government of Bulgaria
HSPA	3G Mobile Broadband
ICT	Information and Communication Technology
IP	Intellectual Property
IPR	Intellectual Property Rights
LTE	4G Mobile Broadband
M&E	Monitoring and Evaluation
MEE	Ministry of Economy and Energy
MS	Member States (of the European Union)
MTITC	Ministry of Transport, Information Technology and Communications
NGO	Non-Governmental Organization
NCI	National Council for Innovation
NGA	Next Generation Access
NKIB	National Knowledge and Innovation Board
NIF	National Innovation Fund
NIS	National Innovation Strategy
NRP	National Reform Program
NSF	National Science Fund
OP	Operational Program
OPAC	Operational Program Administrative Capacity
PROs	Public Research Organizations

R&D	Research and Development
RDIs	Research and Development Institutes
RIS3	Research and Innovation Smart Specialization Strategy
RIS	Research and Innovation Strategy
SMEs	Small And Medium-sized Enterprises

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## Executive Summary

**The purpose of this technical note is to provide an assessment of the digital agenda in Bulgaria and to offer a set of short- and long-term recommendations.** As part of the Reimbursable Advisory Services Program on Innovation, the note contributes to the development of Bulgaria's Research and Innovation Strategy for Smart Specialization (RIS3). Chapter 1 of this note examines the importance of the ICT ecosystem and the internet economy. Chapter 2 analyses Bulgaria's performance against the targets of the Digital Agenda for Europe (DAE). Chapter 3 reviews the current capabilities of Bulgaria's ICT institutions and broadband infrastructure. Chapter 4 focuses on the ICT policy options to strengthen digital growth and RIS3 in Bulgaria. The findings of this note underline the following five strategic recommendations: (i) strengthen the institutional coordination and governance of ICT, (ii) expand coverage in rural areas and increase penetration of broadband across Bulgaria, (iii) establish capacities for the e-Government and e-Procurement, (iv) advance the development of digital literacy (e-Skills), and (v) strengthen the competitiveness of clusters through ICT.

**Since the birth of the World Wide Web twenty-five years ago, Information and Communication Technology (ICT) has become a powerful driver of an economy's competitiveness, economic growth, innovation, research and increased productivity.** ICT drives 20% of total productivity growth in the European economy<sup>1</sup>, while representing 5% of GDP and 25% of total business R&D. The increasing ubiquity of the internet has led to the evolution of both ICT and innovation, resulting in a more open, dynamic and inclusive eco-system. The adoption of fast and super-fast broadband has accelerated this evolution, providing many new opportunities for content, applications and platform providers, who compete, innovate and co-operate irrespective of their location. The rate of ICT innovation occurs at a fast pace and in the direction, which is becoming difficult to predict accurately. It happens because of quickly changing technologies, user preferences, and costs. Faster broadband and wireless enable people to take advantage of new digital tools such as GIS mapping, the cloud, telemedicine, virtual reality, supercomputing, mobile health, distance learning, civic engagement, and smart energy grids require sufficient bandwidth. In addition, broadband enables Business Process Outsourcing (BPO).

**The European Commission (EC) established the DAE framework that aims to catalyse Europe's economy through ICT.** The DAE will maximize social and economic benefits for its citizens and businesses. Similar to Smart Specialization, the 'digital agenda' was made one of the pre-conditions ('ex ante' conditionality) for EU member states to access the EU Structural Funds in 2014 - 2020. In order to monitor member states' progress toward achieving the DAE targets, the EC publishes the DAE Scoreboard. Bulgaria's progress relative to the EU average is exhibited in Table 1. A review of the data relating to the DAE scoreboard indicates that in Bulgaria:

- Broadband coverage is near the EU average and close to the DAE target
- Rural broadband coverage is below the EU average
- Next Generation Access (NGA) broadband coverage is above the EU average
- Broadband penetration/take up is below the EU average
- Data rates of the coverage are above EU average but below DAE targets

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<sup>1</sup>[https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/european\\_competitiveness\\_report\\_2010.pdf](https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/european_competitiveness_report_2010.pdf)

- SME participation in on-line markets is low
- The proportion of enterprise turnover from e-commerce is very low
- Citizen participation in on-line markets is low
- Half the population are regular internet users
- More than 40% of citizens have never used the internet
- A low proportion of citizens are returning forms on-line to public authorities

Table 1: DAE scoreboard performance of the EU and Bulgaria

Target	Date for completion	EU Progress %	Latest status in Bulgaria %
>30 Mbps coverage for all	2020	54	>30
50% HH take up >100 Mbps	2020	2	<1
33% SME selling on-line	2015	13	4
20% Pop buying X-border on-line	2015	11	<3
50% Pop buying on-line	2015	45	6
75% Pop regular internet users	2015	70	50
15% Pop never use internet	2015	20	42
50% Pop using e-government	2015	44	27
25% Pop using e-gov and returning forms	2015	22	11
Broadband coverage for all	2013	95.5	>90

Source: European Commission.

**Some of the above results demonstrate an outstanding performance, while other results give a cause for concern.** For example, while NGA coverage exceeds the EU average, penetration is still low in Bulgaria. There is a positive correlation between broadband penetration and the competitiveness of a country like Bulgaria, where broadband penetration is low. There is a similar relationship between the proportion of citizens who are regular internet users and the proportion with good computer and internet skills. In turn, this skills factor links into the level of ICT professionals in the economy and has a negative impact on the take up of e-commerce, e-practices in general and thereby the prospects for all businesses. While substantial progress has been made in the establishment of e-government service, there are inter-related impediments to the broadband enabled transformation such as low broadband take-up and rural broadband coverage, low participation in e-commerce and low levels of ICT and computer skills. As a consequence Bulgaria risks becoming relatively less competitive and less attractive for citizens, businesses and investors.

### ***Setting the priorities for Bulgaria's Digital Growth Action Program***

The findings of this technical note underline the urgent need to address and implement five strategic objectives and recommendations, providing the basis for an action program aligned with the Smart Specialization Strategy: One set of recommendations focus on the supply-side of the broadband market (e.g. regarding rural access) while another set focus on the demand-side with e-government assuming a driving role. A third set address digital literacy and related skills which are essential to the functioning of



both sides of the market, while a fourth set pull all of these recommendations together around digital growth through enhanced competitiveness and encouraging clusters. However the key finding is the requirement for a strengthened leading organising authority within government to implement specific tasks, co-ordinate and take responsibility for the Digital Growth Action Plan for Bulgaria.

#### **I. Organise: Strengthen the institutional coordination and governance of ICT**

**It is recommended that the Government of Bulgaria as a matter of extreme urgency establish a single organising body to implement specific tasks, co-ordinate and take responsibility for the Digital Growth Action Plan.** The recommended Digital Action Plan for Bulgaria (its Digital Agenda) is aligned fully with the 2020 vision of the country for smart, inclusive and sustainable growth and has a central role to play in fulfilling this vision. This action plan is centered on activities that are to be undertaken by government across a broad range of locations and initiatives. In order for the action plan to achieve maximum impact a single organizing body within government must implement specific tasks, co-ordinate and take responsibility for the Digital Growth Action Plan. Clearly such an organising body (OB) must be empowered appropriately to carry its duties. The establishment of the OB is a matter of extreme urgency. The OB should then quickly conclude ‘who does what’ and timetable with all other governmental bodies which will form the basis of the implementation plan for the action plan.

**It is recommended that the Government of Bulgaria obtains EU approval for State aid for the National Framework for Broadband Development.** This is a matter for the OB. The EC monitors the investment of public funds to ensure that State aid is not used to unduly favour one or more private entities in a way that would distort a market. Therefore, in order to comply with State aid regulations, the government has to justify the need for the public intervention through the national framework of projects. Once the entire framework receives a State aid clearance, there is no need to have the EC approval for each individual project.

**In parallel, Bulgaria’s National Strategy for the Development of Broadband needs to be revised, if necessary, to ensure an approval of the framework by EU.** This is a matter for the OB. This task could be completed in 2013 with the Ministry of Transport, Information Technology and Communications working with the communications regulatory and competition authorities. It is possible that the Ministry and the authorities may require technical assistance for this task. It is recommended that such technical assistance (if required) is obtained as a matter of urgency. This priority addresses the supply side, while the demand side of the equation still needs to be addressed in order to ensure the take-up of the provided opportunities. It is quite possible that closing of the rural coverage broadband gap would take Bulgaria above the overall coverage average of the EU 28.

**Bulgaria has the required institutions and regulations to facilitate its move to a broadband-enabled economy since all relevant EU directives have been transposed in Bulgaria.** The institutional task now is to implement in full the directives. Additionally, there is a key role to be played by the Government of Bulgaria and its agencies in terms of both leadership and action. For example only the government can decide when to which to ‘e’ by default for all of its activities, including procurement. Similarly the Ministry of Transport, IT and Communication has major role to play in broadband since it has considerable knowledge and control of key infrastructure (e.g. ducts), which are vital for the inexpensive broadband roll out.

## **II. Supply: Expand coverage of broadband in rural areas and increase its penetration ('take up') across Bulgaria**

**An action plan to bring about complete rural coverage would have sizeable economic consequences.** This is a matter for the OB. A large number of OECD countries have included broadband rollout as an element of their "stimulus package". The multiplier effect would be fairly high due to positive 'externalities'. Tax revenues would rise and unemployment costs fall. The need for access to broadband in rural areas is as great as the needs in urban areas, but due to their lower population densities and disposable GDP per capita, the private sector does not respond to the needs of rural area. In the face of such a clear market failure there is a particular role for public finance to work together with local authorities and regions in partnership and in a co-ordinated manner with the private sector. These investments could benefit from the experiences of other member states and draw on existing business models. The EC funding has been also established to address the issue but such funding requires State aid clearance (see above). It is highly significant that of the list of 120 broadband projects cleared for State aid since 2004, not a single Bulgarian project was on the list.

**The impact of rural e-exclusion in Bulgaria (of nearly 4,000 villages) makes the rural areas more remote, less dynamic with declining competitiveness and diminishing attractiveness to investors and citizens.** This issue has been on the agenda of the government for some time but the advent of very high speed broadband raises the stakes. All the beneficial consequences of broadband usage discussed above are absent in these rural areas. There are long-term consequences of e-exclusion will assume the characteristics of a vicious circle. For instance, recent research in the UK has concluded that the exam results of a million children will be on average a grade lower than their peers, because they do not have internet access at home.

**It is recommended that the Bulgarian authorities adopt the following three measures in 2013**(consistent with the Proposal for a Regulation of the European Parliament and of the Council):

- Ensuring that the new or renovated buildings are high-speed-broadband-ready;
- Opening access to infrastructure on fair and reasonable terms and conditions, including price, to existing ducts, conduits, manholes, cabinets, poles, masts, antennae installations, towers and other supporting constructions -- consistent with recommendation I above, MTITC has a key role to play in both urban and rural areas.
- Establishing an efficient coordination of civil works, by enabling any network operator to negotiate agreements with other infrastructure providers.

## **III. Demand: Establish capacities for the e-Government through e-Procurement and e-Invoicing**

**The electronic delivery of government services is a major driver of broadband take-up, and is particularly important in periods of austerity, where there are pressures on government finances.** From a supply side in Bulgaria, substantial progress has been made in the establishment of e-government services. However there appear to be some obstacles to the take up of these services. In 2012 27% of Bulgarian citizens interacted electronically with public authorities and 11% sent filled-in forms, where the EU averages are 44% and 22% respectively. SMEs interact more actively than citizens with public authorities on-line, at 83% close to the EU average of 87%. The major challenge for the

government is to stimulate substantial widespread demand for e-government services – an action only it can undertake.

**Widespread e-procurement and e-invoicing would provide a substantial stimulus to Bulgarian economy, and in particular e-commerce.** There is a key leadership role for the Government of Bulgaria on the demand side. Purchases by central and local governments and agencies account for a substantial proportion of GDP - the EC estimates €2.3 billion of purchases. One recommended course of action for the government is to fix a date in the near term for the full switch to e-procurement as the default position. This is a matter for the OB. It is also recommended that the Government assumes a leadership role in the EU by moving early on e-invoicing (based on the draft directive). According to the EC more than 80% of Bulgarian businesses already interact on-line with the government, but only a very small fraction of them sell on-line.

**It is recommended that the government seeks a partnership with an experienced e-government region or member state in order to promote e-government to citizens and businesses through switching to e-procurement and e-invoicing.** The costs of the full switch to e-procurement and e-invoicing are trivial in comparison to the costs to the economy of maintaining the e-commerce status quo which seriously lags EU averages. The EC has been particularly active in supporting the development and implementation of e-government services. The basic legal framework for e-government is provided at the European level, for example, the public procurement and more recent e-invoicing Directives, which are transposed into national law. This would provide the opportunity for the early transposition of the draft e-invoicing for public procurement directive thereby placing Bulgaria among the leaders of MS in this activity.

#### **IV. Supply and Demand: Advancing digital literacy (e-Skills) development**

**While the ICT sector is one of the most developed sectors in Bulgaria, there is a high proportion of citizens that have never used the internet combined with relatively low levels of ICT and computer skills.** Surveys undertaken for the Digital Agenda for Europe (DAE) in 2012 found that over 40% of Bulgarian households that do not use the internet due to the lack of necessary skills. This important barrier appears to be especially prevalent among the ageing population in rural areas and ethnic minorities where there are low levels of e-inclusion. Based on Eurostat data, over 10% of the population in Bulgaria has high computer skills compared to the EU average above 25%, while around 8% of the population has high internet skills compared to the EU average of over 10%. One estimate of the importance of these skills is that there are 5 jobs for every IT position.<sup>2</sup> The internet users of Bulgaria are four and a half years behind the EU average in terms of diversification of their online behaviour<sup>3</sup>.

**Government action is required to increase access to computers in schools.** Since the education system is the raw material that feeds into innovation, it is noteworthy that the number of computers in schools per 100 students is relatively low (see Chart D in Annex 1). According to the EC survey of schools in 2011-12 for 8<sup>th</sup> grade students, on average there were 5 students for each computer in the EU and 8 in Bulgaria. Regarding students per internet connected laptop the EU average was 7 with 13 in Bulgaria, and for laptops 14 in the EU and 125 in Bulgaria. Yet, broadband speeds in Bulgaria at all school grades were

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<sup>2</sup>Philip Bond, "Tech Provides Map for Nation's Future," Politico, September 18, 2011.

<sup>3</sup><https://ec.europa.eu/digital-agenda/enhancing-digital-literacy-skills-and-inclusion-analysis-and-data>

higher than in most other countries, and only between 4% and 5% of students, depending on grade, are in schools without broadband<sup>4</sup>. These speeds reflect well on the underlying broadband coverage but more computers are required to take advantage of this potential and ensure future digital growth.

#### V. Pulling it together: Using the ICT to strengthen the competitiveness of clusters

**Bulgaria can take full advantage of digitization to improve competitiveness and stimulate growth across the Cultural and Creative Industries (CCI), tourism and ICT clusters.** Clusters are a source of agglomeration economies – the geographical proximity of firms produces collective benefits – contributing to local competitiveness and economic growth. Thanks to new digital technologies, it is possible to strengthen the connections inside clusters and between clusters, helping ideas and knowledge to ‘jump’ across industries generating unexpected, often more radical innovation outcomes.

**The CCI in Bulgaria are experiencing rapid growth rates and represent a unique offering for digital growth.** The CCI are comprised of a large number of micro and SMEs with a very small number of large enterprises. The CCI are highly innovative as well as ICT and knowledge-intensive. Further, they tend to form clusters where there are substantial positive spill-over outcomes. The CCI include advertising, architecture, arts, antiques and craft, designer fashion, video, film and photography, music and the visual and performing arts, publishing, software, computer games and electronic publishing, radio and TV. Their knowledge and ICT usage intensities provide opportunities for promoting digital jobs and growth. With the application of ICT it is possible to establish virtual creative clusters and thereby achieve economies of agglomeration and urbanisation.

**The application of ICT to tourism in Bulgaria could strengthen the solid performance observed in recent years, and support economic diversification within the context of 3S.** Tourism enterprises and related agencies can propose on-line a large variety of tourism niches based on cultural and natural resources, and ensure the visibility of local tourism providers that are not usually marketed by service providers in major markets. These platforms can also be used to tailor and promote linked activities like tourism and wine making in Bulgaria. Most countries have developed e-tourism websites using simple or more complex destination management systems (DMSs) to organize and promote their tourism resources on broadband networks, which would significantly strengthen Bulgaria’s tourism through effective booking and transaction facilities.

**The ICT cluster could be stimulated by taking into account the planned concentrations of ICT skills in the framework of the revision of the national broadband plan.** This consideration can be undertaken in the near term as an element of pipeline activities for harnessing smart sustainable and inclusive digital growth. A significant concentration of ICT professionals, in facilities like the Sofia Tech Park, working for off-shore enterprises could energise the wider ICT labour market. This momentum would be enhanced if the concentration of ICT skills formed the core of a cluster of ICT and broadband enabled businesses. Clusters involve bridges rather than towers that is, links between various activities rather than pure specialisation and offer a portfolio of opportunities. This means that core activities benefit from the ‘secondary’ activities and *visa versa*.

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<sup>4</sup><https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/KK-31-13-401-EN-N.pdf>

**It would also be important to instil e-commerce practices effectively among all stakeholders and integrate local businesses and actors with platforms and applications.** This necessity only strengthens the case for government leadership and coordination in promoting e-commerce through e-procurement and rolling out broadband in rural areas. In these instances, ICT Innovation vouchers targeted at SMEs could be flexible and useful instruments.

## Summary of Recommendations

<i>Strategic Objectives</i>	<i>Recommendations</i>	
	<i>Short-Term</i>	<i>Medium- and Long-Term</i>
1. Strengthen the institutional coordination and governance of ICT	<ul style="list-style-type: none"> <li>- As a matter of extreme urgency establish a single organising body (OB) to implement specific tasks, co-ordinate and take responsibility for the Digital Growth Action Plan</li> <li>- OB quickly conclude a ‘who does what’ and timetable with all other governmental bodies to form the basis of the implementation plan for the digital growth action plan.</li> <li>- Government to obtain EU approval for State aid to implement projects under Bulgaria’s National Strategy for the Development of Broadband including those in rural areas. Specific OB task</li> <li>- Recruit specialist technical assistance as required</li> </ul>	<p>Implement National Strategy taking care to revise it in the light of developments and opportunities</p> <ul style="list-style-type: none"> <li>- To establish an efficient coordination structure, by enabling any network operator to negotiate agreements with other infrastructure providers</li> </ul>
2. Expand access in rural areas and to increase penetration of broadband across Bulgaria	<p><i>Broadband in rural areas</i></p> <ul style="list-style-type: none"> <li>- To secure public and private finances for investing in rural broadband infrastructure, and to establish an implementation schedule for the rural broadband projects (specific OB task);</li> <li>- To undertake the mapping exercise of the existing broadband infrastructure;</li> <li>- To support operators and potential entrants to adopt and roll out the rural broadband projects based on investment models proposed by the EU</li> </ul> <p><i>Penetration (take up) of broadband across Bulgaria</i></p> <ul style="list-style-type: none"> <li>- To ensure that the new or renovated buildings have a technical capacity for the high-speed broadband;</li> <li>- To open the access to infrastructure on fair and reasonable terms and conditions, including price, existing ducts, conduits, manholes, cabinets, poles, masts, antennae installations, towers and other supporting constructions.</li> </ul>	<ul style="list-style-type: none"> <li>- To establish the monitoring and evaluation framework for the implementation of rural broadband infrastructure projects</li> </ul>

<p>3. Establish capacities for E-Government</p>	<ul style="list-style-type: none"> <li>- To switch to the e-procurement and e-invoicing as the default position by the Government in order to fully roll out the e-government services; (specific OB task)</li> <li>- To partner with an experienced e-government region or EU member state in order to adopt the best practices in implementation of the e-procurement, e-invoicing, e-delivery (e.g. the platform and technical aspects of services), focusing on the demand side for services</li> </ul>	<p>Establish EU leadership role for Bulgaria in e-government</p>
<p>4. Advance digital literacy (e-Skills) development</p>	<ul style="list-style-type: none"> <li>- Government action could be required regarding an increase of access to computers in schools and provide adequate ICT literacy trainers;</li> <li>- To provide e-Skills around the clusters in High Tech Parks (CCI, ICT and Tourism);</li> <li>- To harness the knowledge, skills and business networks of Bulgarian ICT experts living abroad.</li> </ul>	<p>Following rural roll out of broadband ensure that</p> <ul style="list-style-type: none"> <li>• All schools, medical facilities and other public offices are connected</li> <li>• Sufficient ICT literacy trainers are available in rural areas</li> <li>• Compelling content and apps are available for rural users</li> </ul>
<p>5. Utilize ICT to strengthen the competitiveness of clusters</p>	<ul style="list-style-type: none"> <li>- To integrate the CCI clusters in the National Strategy for Broadband Development or the National ICT framework</li> <li>- To strengthen clusters around the planned concentrations of ICT skills such those found in High Tech Parks (CCI clusters, ICT and Tourism);</li> <li>- To support an implementation of the ICT Innovation Vouchers targeted at SMEs;</li> <li>- To establish the consultations with CCI on ways to maximize the digital growth</li> <li>- To support e-commerce across all sectors</li> </ul>	<ul style="list-style-type: none"> <li>- To acquire a state of the art Destination Management System run by the Destination Management Organizations as part of the revision of the National Strategy for Broadband Development or the National ICT framework;</li> <li>- To establish and implement the framework conducive to e-commerce/e-business practices</li> </ul>

Table 2: SWOT Analysis for Bulgaria - Digital Agenda ICT

<p style="text-align: center;"><b>Strengths</b></p> <ul style="list-style-type: none"> <li>- The EU can provide significant support for an accelerated development of the digital economy which in turn will support smart sustainable and inclusive growth objectives of Europe 2020 strategy and 3S</li> <li>- Broadband coverage is near the EU average and close to the DAE target</li> <li>- Next Generation Access broadband coverage is significantly above the EU average</li> <li>- 3G mobile broadband coverage is above EU average</li> <li>- Data rates of the coverage are above EU average but below DAE targets</li> <li>- Cable TV penetration above EU average</li> <li>- Data rates available in schools are among the highest in the EU</li> <li>- A high proportion of businesses interact with public authorities on-line</li> <li>- SME electronic interaction with public authorities is high and close to EU average</li> <li>- Half the population are regular internet uses</li> <li>- The institutions, legislation and regulations are in place to harness digital growth</li> <li>- The Ministry of Transport, IT and Communication has powers over key infrastructure assets access to which are vital for inexpensive broadband roll out</li> <li>- Strategic plans have been drafted regarding the achievement of the Digital Agenda and as the basis for State aids clearance</li> <li>- ‘Best in Class’ regarding time to issue building permits for communications infrastructure</li> <li>- Substantial progress has been made in the establishment of e-government services</li> <li>- Expansion of High Technology Parks in progress</li> <li>- Unique culture and language, fast growing creative sector</li> <li>- 9 UNESCO World Heritage Sites with clear tourist appeal</li> <li>- Unencumbered by legacy assets, platforms and systems, generally falling costs of technology</li> </ul>	<p style="text-align: center;"><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>- Rural broadband coverage is below the EU average with no internet in a large number of villages</li> <li>- No broadband project in Bulgaria has received clearance for State aid purposes and no broadband connections provided under ERDF/CF support</li> <li>- Below EU average for ultra-fast broadband</li> <li>- Broadband penetration/take up is below the EU average</li> <li>- 3G mobile broadband penetration below EU average</li> <li>- More than 40% of the population have never used the internet and are unlikely to possess essential e-skills</li> <li>- Low levels of ICT and computer skills</li> <li>- Proportion of ICT professional in total workforce below EU average</li> <li>- Proportion of disadvantage people who regularly use the internet below EU average</li> <li>- SME participation in on-line markets is low</li> <li>- Very low procurement by public authorities by electronic means</li> <li>- The proportion of enterprise turnover from e-commerce is very low</li> <li>- Citizen participation in on-line markets is low</li> <li>- Citizen take up of e-government services is very low and e-government offering lacks co-ordination</li> <li>- A low proportion of citizens are returning forms on-line to public authorities</li> </ul>
<p style="text-align: center;"><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>- Substantial digital growth potential from e-commerce, e-procurement, ICT enabled clusters, cultural and creative industries and tourism</li> <li>- Digital growth will provide positive spill over to other sectors in particular payments and delivery systems</li> </ul>	<p style="text-align: center;"><b>Threats</b></p> <ul style="list-style-type: none"> <li>- Failure to achieve the DAE targets would put at risk the smart sustainable and inclusive growth objectives of Europe 2020 strategy and 3S with major macro-economic and social consequences</li> <li>- Increasing quasi fiscal pressures on government finances</li> </ul>

- Access to EU support and financial instruments to improve access to broadband in rural areas, switch to e-procurement as default position, early adoption of e-invoicing for public procurement, acquiring e-skills, developing innovations and harnessing digital growth
- Fulfilling e-government recommendations of EU Council on Europe 2020 growth strategy
- Holding a leadership position among MS by early adoption of regulations to reduce costs of deploying high speed broadband and implementing e-invoicing for public procurement
- Possibilities of forming a partnership with another MS or Region for the purposes further developing e-government vision, switching to e-procurement default, incentivizing citizens to take up e-government services and early implementation of e-invoicing for public procurement
- Moving directly to state of the art solutions and best practice procedures
- The costs of the full switch by government to e-procurement and e-invoicing are trivial in comparison to the costs to the economy of not switching over and maintaining the e-commerce status quo

- Declining competitiveness, attraction to investors and citizens
- Increased e-exclusion, widening social and economic disparities, declining active workforce and insufficient e-skills



## Chapter 1: The importance of the Digital Agenda and ICT growth for Bulgaria's Smart Specialization

1.1. Since the birth of the World Wide Web twenty-five years ago, digitization of society and in particular Information and Communication Technology (ICT) has become a powerful driver of an economy's competitiveness, economic growth, innovation, research and increased productivity. According to the European Commission's Digital Competitiveness report<sup>5</sup>, ICT drives 20% of total productivity growth in the European economy, while representing 5% of GDP and 25% of total business R&D. To advance this paradigm, the European Commission (EC) established the Digital Agenda for Europe (DAE) framework that aims to catalyze Europe's economy through ICT. The DAE will maximize social and economic benefits for its citizens and business. Similar to Smart Specialization, the 'digital agenda' was made one of the pre-conditions ('ex ante' conditionality) for EU member states to access the Structural Funds in 2014 - 2020.

### A. The ICT Ecosystem

1.2. The ICT sector can be considered as a form of 'ecosystem'<sup>6</sup>, characterized by a significant interaction between the various ICT players and final consumers/users. In the ICT supply chain, there are three layers that can be identified:

- Layer 1: Network element suppliers (e.g. Cisco, Samsung, Alcatel, Ericson, Nokia, Intel)
- Layer 2: Network operators (fixed and mobile) (e.g. Vivacom, Mobitel, Telefonica, Vodafone)
- Layer 3: Platform, content, application providers (e.g. Google, i-store, YouTube, Twitter)

1.3. The nature and evolution of the ICT ecosystem has important ramifications for innovation and competitiveness. For many years the dominant set of interactions was only between network operators and network suppliers (Layers 1 and 2). This gave a rise to a 'closed' ICT ecosystem, where innovation processes tended to exclude other players. However, the ecosystem began to evolve at an accelerating rate during the broadband era, when access to the internet became widespread and affordable. In the emerging superfast broadband era, the rate of evolution will quicken.

1.4. Today, ecosystem interactions are much more inclusive and 'open' so that there are many more players. One aspect of this evolution is the mass of user-generated content on broadband networks. Another is the generalized fracturing of boundaries between layers, where Layer 3 players may enter Layer 1 and Layer 2 players becoming content providers in Layer 3. Perhaps the most important feature of the current ecosystem is the enhanced role of Layer 3.

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<sup>5</sup>[https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/european\\_competitiveness\\_report\\_2010.pdf](https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/european_competitiveness_report_2010.pdf)

<sup>6</sup>See for example R. Veugeller, "New ICT Sectors: platforms for European growth?" Bruegel Policy Contribution, August 2012.

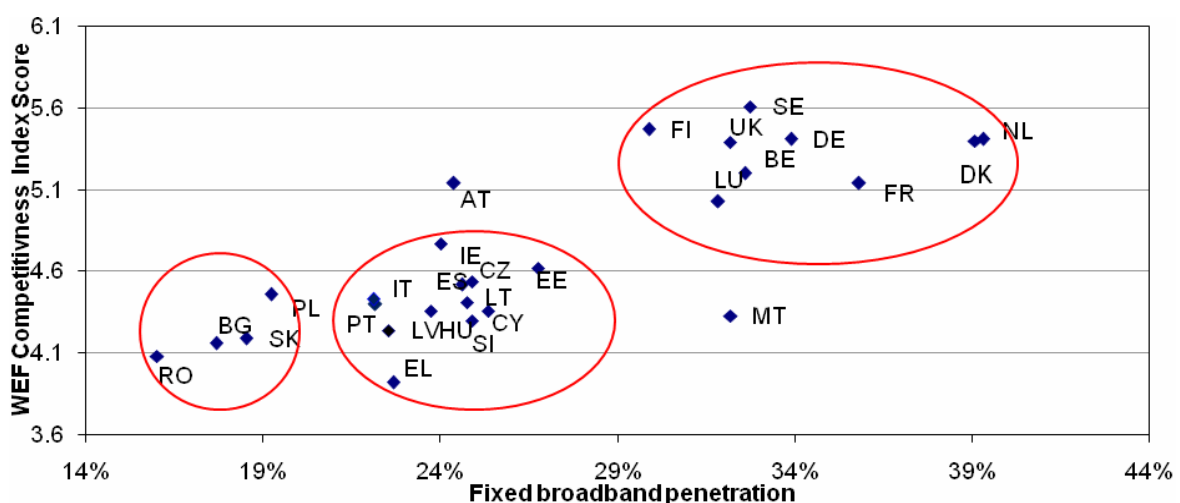
1.5. Layer 3 players are providing significant momentum to the functioning of the ecosystem and the innovation process through their interaction with each other and final customers/users. Layer 3 players interact as intermediaries with businesses that want to sell and consumers who want to buy or people who wish to create and audiences who wish to experience. This intermediation takes place on a global scale over broadband infrastructure.

1.6. Such intermediation is a new paradigm. Increasingly, competition and cooperation in the ecosystem takes place between and within platforms. A platform is an open system with well-defined enforceable rules and access points on which third parties can build applications (apps) or offer services or provide content. In this way Layer 3 becomes a focus for and key enabler of innovation. By these means innovators in Bulgaria could co-operate with peers in Chile to reach audiences in Australia. The key to this process is widespread and affordable access to broadband for those who want to buy (or experience) and those that want to sell (or create).

1.7. As an example, the impact of broadband in Kansas City, where Google first experimented with super-fast broadband connections (1 gigabit) was enormous in terms of increasing the city's competitiveness. While the residents quickly abandoned other options, entrepreneurs relocated to the city to take advantage of the unique offer. Local officials saw a mini-boom in business and publicity. In response, the Time Warner Cable in Kansas City began to offer city officials contracts with much faster speeds than it had previously offered, as a result of the competitive pressure in Kansas City.

1.8. Figure 1 demonstrates the relationship between access to broadband and competitiveness. It shows a positive correlation for EU member states between broadband penetration and competitiveness as measured by the Competitiveness Index produced by the World Economic Forum. The figure demonstrates there are broadly 3 groups of member states, the leaders, the chasers and the laggards. Bulgaria is in the last group because it has a low level of broadband penetration or take-up.

Figure 1: Correlation Fixed broadband penetration and competitiveness



Source: European Commission, 2012

1.9. The benefits of broadband are not confined to competitiveness. A recent EC study<sup>7</sup> emphasizes the benefits of broadband across the sectors: “community”, “crime, public safety and online government services”, “education and skills”, “employment and economy”, “environment”, “equality and inclusion”, “finance and income”, “healthcare” and “wellbeing”. The range of benefits that flow from broadband access re-confirms that broadband is a “general purpose technology”.

## B. The Internet Economy

1.10. The internet advantage is not specific to any particular activity and is available to “the butcher, the baker and the candlestick maker” – confirming its general purpose – though of course there are activities that are only made possible by access to the internet. Recent research demonstrates that broadband has an impact on economic growth, job creation, the price of real estate and is an enabler of green growth via smart grids, smart meters, big data analytics for traffic flow management, logistics etc. Broadband drives competitiveness in manufacturing through IT-enabled supply chains: broadband powers the most relevant innovation in the production processes likely to shape the future of manufacturing (digital modeling, simulation and visualization, big data analytics, social and collaborative technologies, and just-in-time supply). In addition, broadband enables Business Process Outsourcing (BPO).

1.11. A well-functioning internet economy is integral for moving the technological frontier of innovation across the firm-, industry- and economy levels. Faster broadband and wireless speeds also enable people to take advantage of new digital tools such as GIS mapping, the cloud, telemedicine, virtual reality, online games, supercomputing, video on demand, and video conferencing. New developments in health information technology and mobile health, such as emailing X-rays and other medical tests, require high-speed broadband. And distance learning, civic engagement, and smart energy grids require sufficient bandwidth. Finally, digitization allows governments to operate with greater transparency and efficiency.

1.12. The internet advantage is not only specific to developed countries, contrary to popular opinion, the evidence suggests that developing countries<sup>8</sup> are embracing this advantage more quickly than the developed, skipping an intermediate step on the ladder of technological advance. Regression analysis has found that a 10 percent rise in broadband penetration in developing countries increases GDP by 1.38 percent on average. Furthermore, for every percentage point increase in the number of internet users, there is a boost in exports of 4.3 percentage points. An econometric study targeting emerging economies found a strong correlation between broadband development in a competitive environment and foreign direct investment<sup>9</sup> (FDI).

1.13. The Bulgarian economy needs to establish a system to properly capture the economic gains from ICT-enabled business innovations. As an example, the Boston Consulting Group (BCG) has quantified the impact of the internet (and internet enabled activities) on individual economies by assessing its

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<sup>7</sup>European Commission “The socio-economic benefits of bandwidth”, 2013

<sup>8</sup> For example, Botswana Craft has successfully been selling handmade basket ware on-line for many years, see <http://www.botswanacraft.bw/gallery/index.html>

<sup>9</sup><http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/0,,contentMDK:23131973~pagePK:148956~piPK:216618~theSitePK:282823,00.html>

contribution to GDP<sup>10</sup>. The BCG report distinguishes four levels of capturing internet's economic impacts in the UK: (i) impacts captured by GDP through digital transactions (e.g. consumer transactions that originate on the internet such as downloads of movies, excluding what requires transportation and shipment such as purchasing groceries online), plus internet related investments, government spending and net exports, (ii) impacts that are not included or indirectly reflected in GDP, e.g. B2B e-commerce models, on-line advertising and consumer surplus, (iii) not captured in GDP productivity gains from e-procurement in manufacturing and e-sales in wholesale and retail trade, and (iv) non-measurable social benefits like sharing user-generated content, using social networking sites. For 2010, BCG found the average contribution of the internet for G-20 countries was 4.3% of GDP with a range from 1.3% in Indonesia to 8.3% for the UK, with the average for the EU 27 standing at 3.8% of GDP.

1.14. Importantly, BCG found that among SMEs, which were intensive web-users, the rate of sales growth was 22% higher (over a 3 year period) than those SMEs that were low or not web-users. In the UK SMEs with intensive web-use grew sales 6 times faster than those with no internet presence. There is also evidence that high web-user companies have an international customer base and tend to generate more new jobs. For companies the "internet advantage" is derived from a combination of the following factors: a wider customer base, enhanced marketing, improved customer interactions, easier and quicker staff recruitment, leveraging the cloud by accessing sophisticated tools.

1.15. Another recent study measuring the impact of ICT, the Global Information Technology Report 2012 "Living in a Hyper Connected World" by the World Economic Forum<sup>11</sup>, found that the larger benefits are linked to a growing usage of digital technologies and apps, rather than access alone. Bulgaria is ranked 70th among 142 countries in the Networked Readiness Index 2012, being placed in the transitional stage of digitization. The digitization impact on Bulgarian economy was ranked 69<sup>th</sup>, and the social impact was ranked 55<sup>th</sup> among 142 countries. Generally, it was also concluded that the digitization has a proven impact on reducing unemployment, improving quality of life, and boosting citizens' access to public services.

1.16. These results present a considerable opportunity for Bulgaria since coverage is high, but penetration is low although the proportion of 'never used' is high. Clearly there is a considerable room for growth in both penetration and users. Relevant EU Directives have been transposed into Bulgarian law and institutions have been established. Consequently the tools are in place for the successful implementation of the Smart Specialization Strategy (3S) in Bulgaria and for a drive a great use of apps.

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<sup>10</sup>See "The Connected Kingdom: how the internet is transforming the UK economy", 2010 and "The Internet Economy in the G-20", 2012 both BCG Connected World.

<sup>11</sup>[http://www3.weforum.org/docs/Global\\_IT\\_Report\\_2012.pdf](http://www3.weforum.org/docs/Global_IT_Report_2012.pdf)

## 1.17.

### Chapter 2: Bulgaria's position in the Digital Agenda for Europe (DAE)

2.1. Europe 2020 is the European Union's ten-year growth strategy to deliver smart, sustainable and inclusive growth<sup>12</sup>. The strategy includes for each member state a set of quantifiable targets which cover employment; education; research and innovation; social inclusion and poverty reduction; and climate/energy. The Europe 2020 strategy also includes seven 'flagship initiatives' providing a framework through which the national authorities and the EU mutually reinforce their efforts in areas supporting the Europe 2020 priorities such as innovation, the digital economy, employment, youth, industrial policy, poverty, and resource efficiency. Given the general purpose technology status of ICT and broadband, they are included in some form in each of these initiatives.

2.2. In May 2010, the European Commission (EC) established the Digital Agenda for Europe (DAE) framework that aims to catalyse Europe's economy through ICT as part of the Europe 2020 strategy. The DAE will maximize social and economic benefits for its citizens and businesses. The EC has made this framework one of the pre-conditions ('*ex ante*' conditionality) for EU member states to access the Structural Funds in 2014 - 2020.

2.3. A review of DAE was published at the end of 2012 and it is organized around 7 key areas for further efforts to stimulate the conditions to create growth and jobs in Europe<sup>13</sup>:

- 1) Create a new and stable broadband regulatory environment
- 2) New public digital service infrastructures through Connecting Europe Facility loans
- 3) Launch Grand Coalition on Digital Skills and Jobs
- 4) Propose EU cyber-security strategy and Directive
- 5) Update EU's Copyright Framework
- 6) Accelerate cloud computing through public sector buying power
- 7) Launch new electronics industrial strategy – an "Airbus of Chips"

2.4. The EC estimates that the full implementation of the DAE will increase European GDP by 5% by 2020 through increasing investment in ICT, improving e-Skills levels in the labor force, enabling public sector innovation, and reforming the framework conditions for the internet economy. In terms of employment, the EC estimates up to one million digital jobs risk going unfilled by 2015 without pan-European action, while 1.2 million jobs could be created through infrastructure construction, rising to 3.8 million new jobs throughout the economy in the long term.

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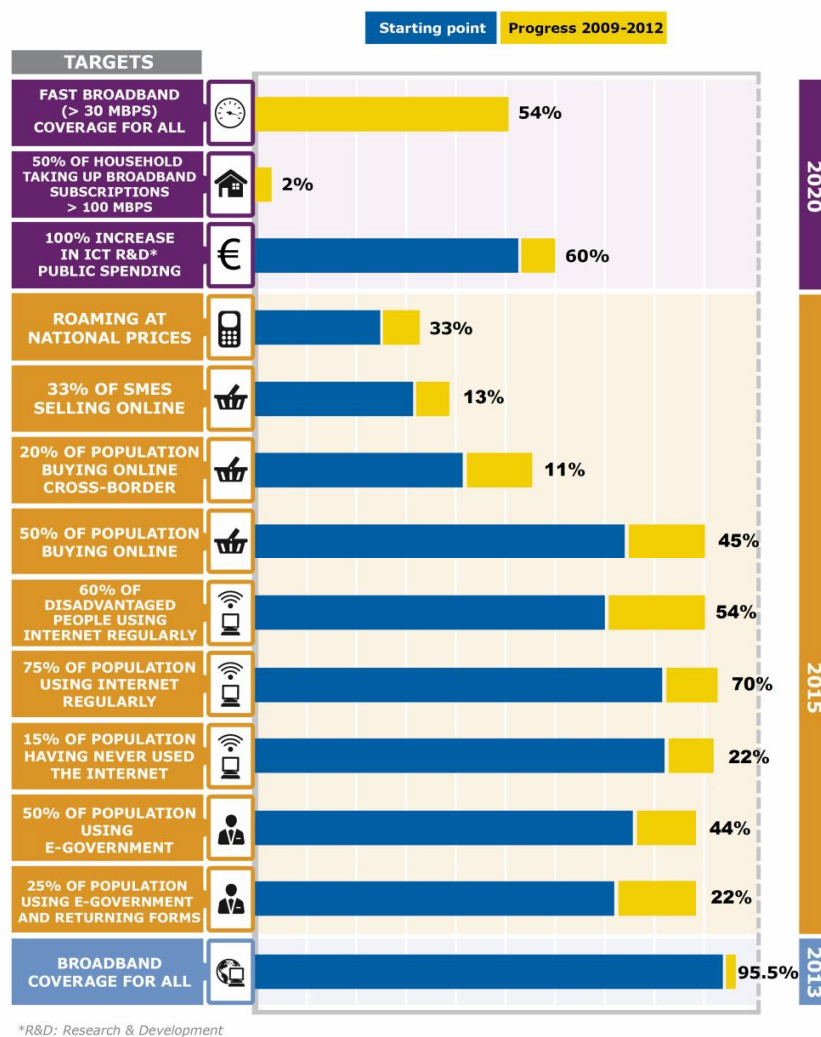
<sup>12</sup>[http://ec.europa.eu/europe2020/index\\_en.htm](http://ec.europa.eu/europe2020/index_en.htm)

<sup>13</sup><http://ec.europa.eu/digital-agenda/digital-agenda-europe>

## A. The DAE Targets

2.5. DAE contains thirteen clearly defined goals, which track the digital transformation to be achieved as part of objectives of the Europe 2020 Strategy. The progress against these targets is measured in the annual Digital Agenda Scoreboard.

Figure 2: DAE Targets and Achievements 2012



Source: European Commission, Digital Agenda Scoreboard 2012

Source: DAE Scoreboard, accessed June 2013.

2.6. Figure 2 lists thirteen major Digital Agenda for Europe (DAE) targets and progress achieved across the EU 27. Eleven of the major targets relate to broadband with the “Broadband Coverage for All” target almost achieved by end 2012 – a major achievement. The “fast broadband coverage for all” has

only achieved 54% of the target. Only 2% of the target of 50% of households subscribing to very fast broadband (> 100 Mbps), while 70% of the target of 75% of the population using the internet regularly has been achieved i.e., 52.2% of the population of the EU 27 are using the internet regularly.

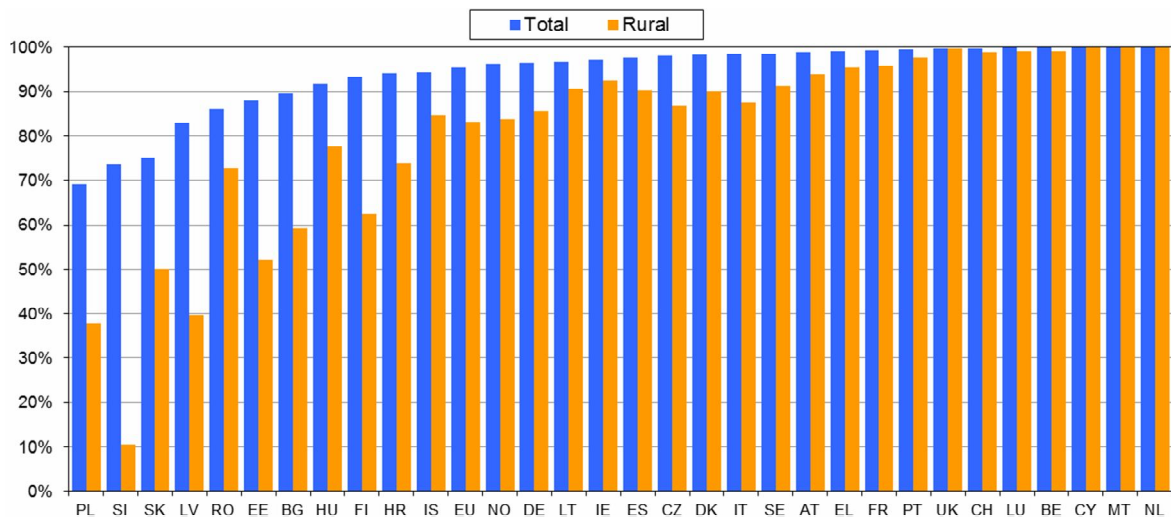
2.7. By comparing the progress of Bulgaria on these targets, it is possible to identify a set of actionable priorities that would ensure the full participation of Bulgaria in the new economy, enhance the prospects of success of 3S, and promote smart, sustainable and inclusive growth.

## B. Coverage and Availability of Broadband

2.8. There are well over 500 broadband operators on the Bulgarian market though they tend to be clustered in a limited number of markets, e.g. there are almost 100 operators in Sofia. As illustrated by Charts A and B in Annex 1, the incumbent provides around 25% of fixed broadband lines but 100% of digital subscriber lines (DSL). Operators provide coverage, which refers to the availability of broadband in a territory, but not the take-up of broadband.

2.9. Figure 3 presents data for the 27 EU member states and the EU 27 average for rural and national fixed broadband coverage. At the national level Bulgaria is close to the EU average though rural coverage is below the EU average but shows signs of improvement since 2011. Closing this rural gap can be considered a high priority.

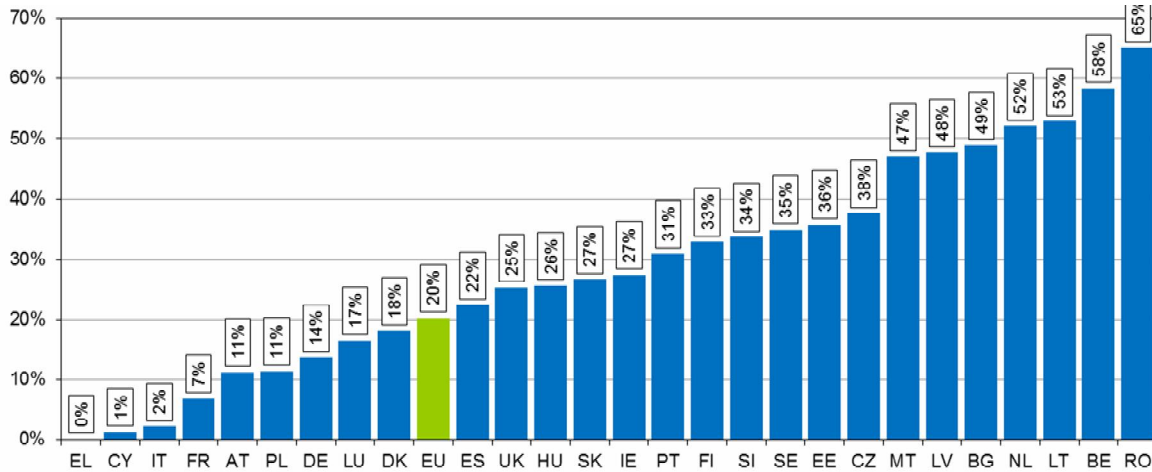
Figure 3: Standard fixed coverage, end of 2012



Source: European Commission. Standard includes xDSL, Cable, FTTP, and WiMax.

2.10. Bulgaria scores very well having the NGA coverage proportion substantially above the EU average (fig.4). Bulgaria can boast that 49% of its coverage is a form of NGA.

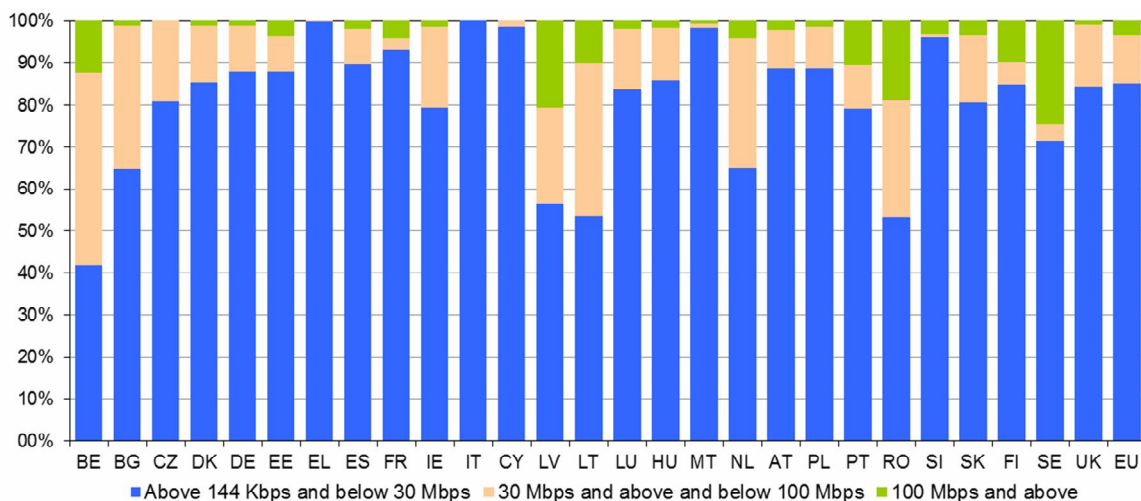
Figure 4: NGA (FTTH, FTTB, VDSL, Cable Docsis 3.0 and other NGA) lines as a % of total fixed broadband lines, January 2013



Source: European Commission, 2013

2.11. Figure 5 provides further insights to the underlying data rates available in Bulgaria where the proportion of lines (around 30%) with data rates between 30 and 100Mbps is above the EU average, which is a considerable achievement. The DAE target is above 30 Mbps for all by 2020, making roll out of high-speed broadband another priority in Bulgaria.

Figure 5: Fixed broadband lines by speed (Digital Agenda categories), January 2013



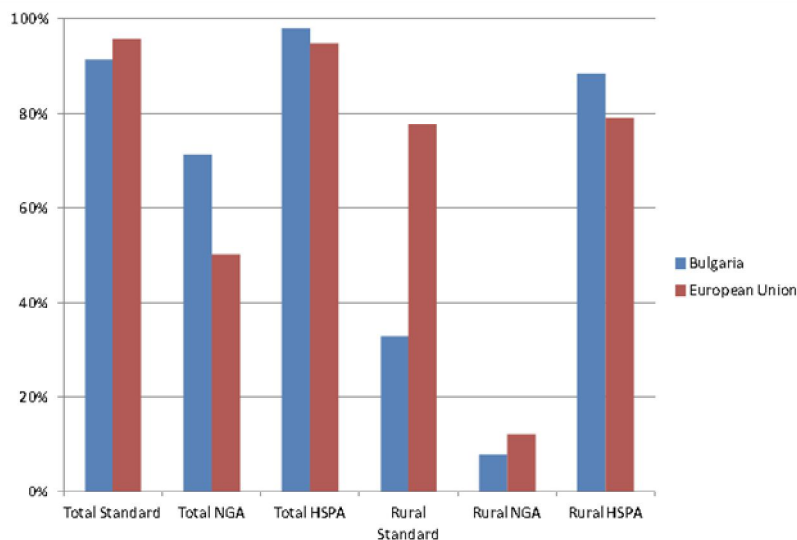
Source: European Commission, 2013



2.12. The above charts demonstrate that in terms of coverage, Bulgaria is very well placed to achieve the DAE 2020 targets and there is a high proportion of NGA broadband in place. In terms of high speed broadband (> 30 Mbps) lines Bulgaria has 35.1% coverage against the average EU of 14.8%. But it falls behind the EU average (3.4%) for ultra-fast lines with a score of 1.2%.

2.13. It should be noted that cable TV penetration in Bulgaria is above the EU average and that mobile operators also supply fixed services. These factors contribute to broadband coverage and represent a string of achievements. However, rural coverage is very low and rural areas do not easily attract cable TV companies or fixed suppliers. Figure 6 demonstrates this aspect of the Bulgarian broadband market in 2011.

Figure 6: Total and Rural Broadband Coverage in Bulgaria and EU, 2011



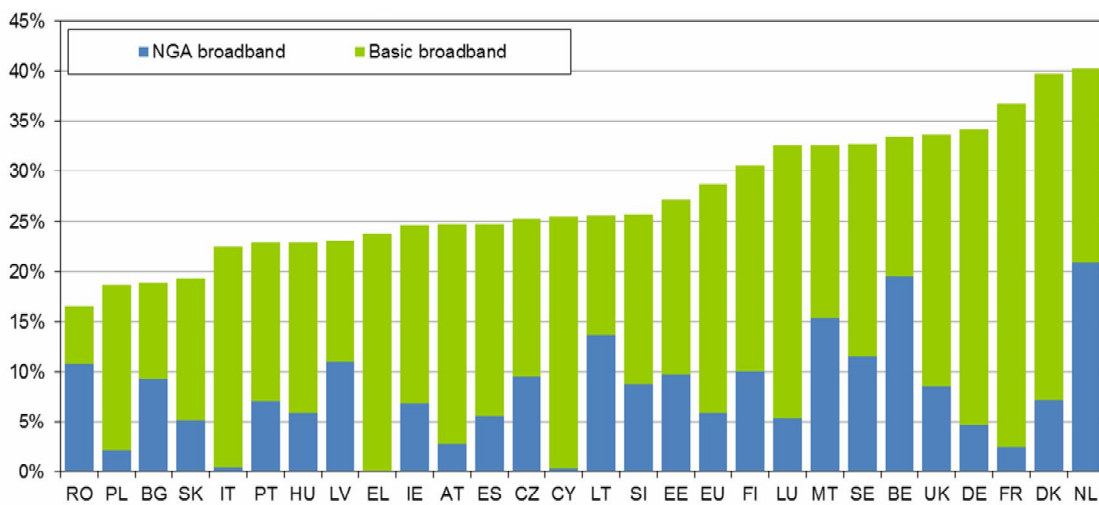
Source: European Commission.

2.14. Overall (total) broadband coverage is slightly below the EU average, but NGA in Bulgaria is above the EU average as is total mobile HSPA. The major gap is in rural areas for standard and NGA broadband. Rural HSPA broadband is above the EU average but this service is not necessarily targeted at rural customers but rather an on-going component of roll out obligations. The most likely target of this service is mobile customers on the move which happen to travel through rural areas. It is quite possible that closing the rural coverage broadband gap would take Bulgaria above the overall coverage average of the EU 27.

### C. Penetration (Take up)of Broadband

2.15. Penetration refers to the take-up of coverage by paying customers. Figure 7 demonstrates that fixed broadband penetration in Bulgaria is below the EU 27 average. While broadband is available with around 90% coverage it is not being taken up. Broadband penetration rates have risen from 4.5% in 2006 to 7.6% in 2007, to 11.2% in 2008 to 13.0% in 2009 and stood at 17% in July 2012. By January 2013 penetration was 19% of population. Though progress has been achieved operators need to do more to attract paying customers.

Figure 7: Basic and NGA (VDSL, cable DOCSIS 3.0, FTTH and other NGA) broadband penetration, January 2013



Source: European Commission.

2.16. The cost of broadband in Bulgaria is not expensive (see Chart C in Annex 1). On a purchasing power parity (PPP) basis 12 to 30 Mbps cost less than €21 per month among the lowest among all member states though 40% of non-users report that costs of service or equipment are the major reason why they have no access at home<sup>14</sup>. There does not appear to be any offers of data rates lower speeds. Reflecting the high proportion of NGA broadband in Bulgaria, Figure 7 shows that while penetration is low, high-speed broadband access was above the EU 27 average in January 2013.

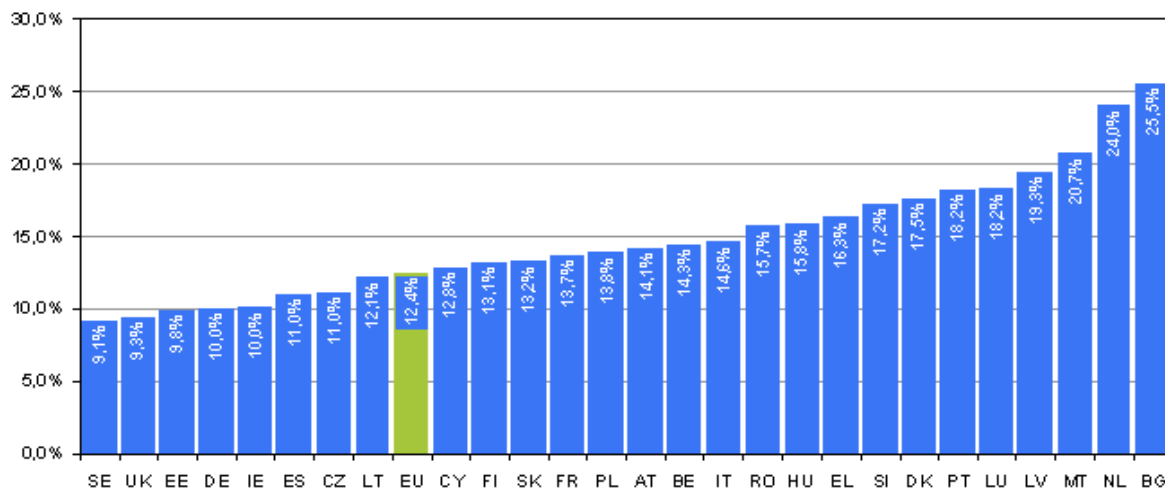
2.17. Bulgaria has a high mobile penetration rate and has a very high voice traffic volume on mobile networks (third in the EU). With respect to mobile broadband penetration as of January 2012 the EU 27 average was 43% penetration with the comparable rate in Bulgaria standing at about a third of this value. 3G mobile broadband (HSPA) was available to 99.4% of Bulgarian population in 2012 (96.3% in the EU), while 4th generation (LTE) was not yet deployed in Bulgaria. The take-up rate (subscriptions as a percentage of population) of mobile broadband was 39.7% in January 2013, below the average of 54.5% in the EU, but a significant increase over 12 months.

<sup>14</sup><https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/DAE%20SCOREBOARD%202013%20-%203-INTERNET%20USE%20AND%20SKILLS.pdf>

2.18. Data on mobile use of the internet shows that in Bulgaria such services have not taken off. Only 13% of individuals in Bulgaria accessed the internet via a mobile device in 2012 (EU average of 36%). Noticeable, only 31% of enterprises provided their staff with a portable device for accessing the internet in 2012, well below the EU average of 48%. There is likely to be a link here with the development of e-commerce and e-government services and platforms.

2.19. Coverage and penetration flow from investments. Interestingly, in 2010 the Bulgarian market telecommunications investments as a proportion of telecommunications revenues were the highest in the EU and twice the EU 27 average. This state of affairs should provide operators with sufficient incentive to raise penetration.

Figure 8: Telecom Investment as a % of revenue, 2010



Source: European Commission.

2.20. Despite the positive developments regarding coverage and data rates available, the issues that still emerge are: a very limited rural broadband access and insufficient take-up (penetration) of broadband by paying customers. These matters are discussed later as they are related to other aspects of the DAE Scoreboard.

## D. Internet Usage

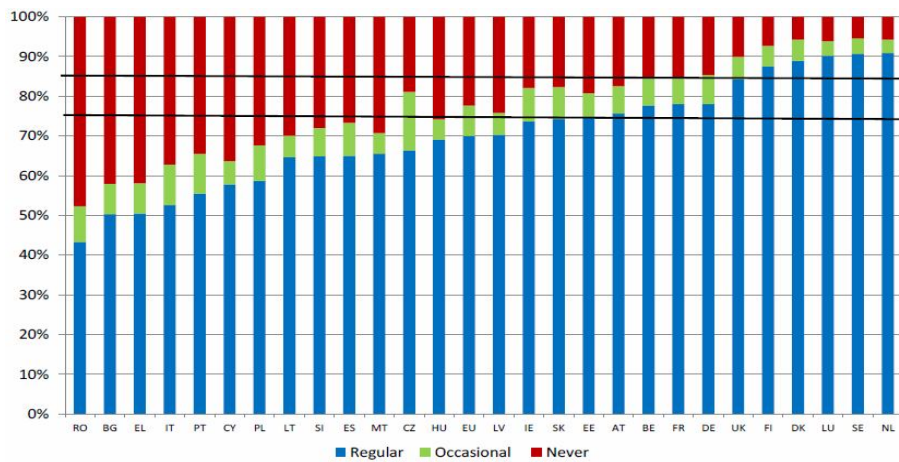
2.21. Some 40% of Bulgarians use the internet on a daily basis but others less frequently. Figure 9 demonstrates how Bulgarian society can be divided into 3 groups in 2012:

- Those that regularly use the internet (once a week), 50% but up from 46%, where the DAE target is 75% by 2015
- Those that have *never* used the internet, more than 42% (including using the internet at work) but down from 46% where the DAE target is 15% by 2015
- The occasional users – 8%

2.22. Only 2% of Europeans have never used the internet. The high level of “never used” in Bulgaria is surprising. The EU regulation on the Universal Service, which has been implemented in Bulgaria, includes a requirement for the provision of “functional internet” (dial-up) by the universal service provider. Vivacom, which retains more than 90% of the fixed voice traffic and is therefore obliged to provide a universal service, should be able to provide a dial-up to all citizens. Some 29% of disadvantaged regularly use the internet compared to the EU average of 54%.

2.23. As previously noted, monthly charges for 12 to 30 Mbps in 2012 in Bulgaria are among the lowest in MS. However around €21 per month (PPP) may exclude some potential users and noticeably there does not appear to be any offers of broadband at lower speeds. A large number of customers in the EU have climbed the internet ladder from dial-up to broadband and appreciate the value of broadband. The more than 40% of citizens who have never used the internet may regard €21 as too costly for something that is entirely novel.

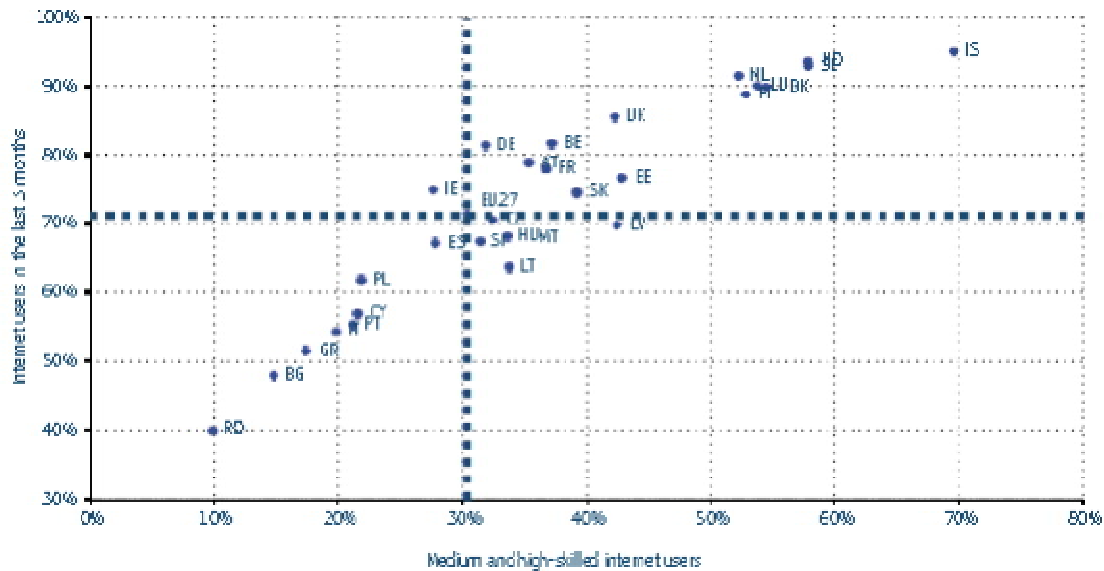
Figure 9: Internet users, regular, occasional and never (% of individuals)



Source: European Commission.

2.24. People who never or infrequently use the internet are unlikely to develop the e-skills required to participate in full in 21st century economic and social life. The frequency of internet use interacts with the levels of relevant skills. This relationship is illustrated by Figure 10, which shows the correlation between a frequency of internet use and levels of internet skills.

Figure 10: Frequency and Skills of the Internet usage



Source: Eurostat.

2.25. There is likely to be a virtuous circle in action, whereby more internet skills are acquired by more frequent internet use, which then encourages a higher frequency of internet use. Internet skills are essential for the Bulgarian workforce if the country is to participate fully in the internet economy. ICT skill levels are also discussed below.

2.26. Another metrics of usage is participation in social networks. It is reported that<sup>15</sup> there were around 2.5 million Facebook accounts in Bulgaria (35% penetration) at 31 December 2012 compared to around 2.9 million (35% penetration) in Austria. Facebook is not just a network for individuals but also an important business tool. As indicated previously the UK is the most intense MS user of the internet where there are 33 million Facebook accounts (52% penetration), with over 7 million in London. A high proportion of these will be business accounts enabling the internet economy of the UK.

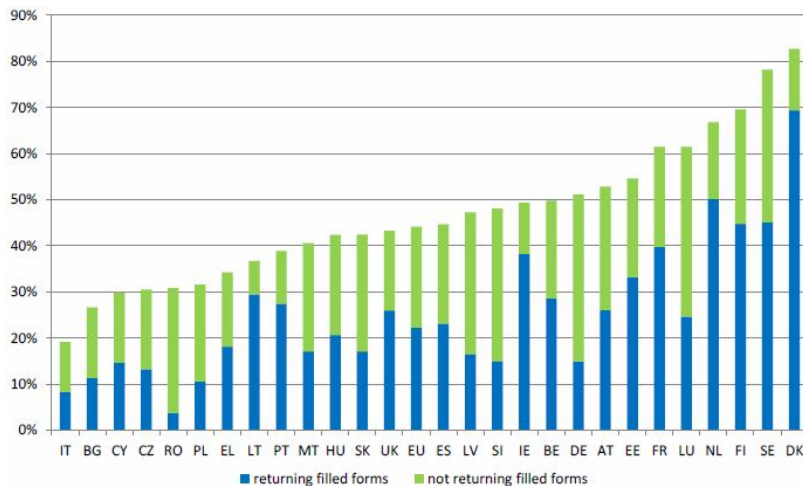
From a supply side, the limited participation of SMEs in e-commerce is a consequence of several interacting factors such as limited access to web design and low levels of ICT/computer/internet skills in the workforce. In turn, demand is constrained by supply and the high levels of citizens that have never used the internet. These circumstances may result in the development of a vicious circle with consequences for the take-up of e-government services. But the issues could be resolved with relatively little funding.

<sup>15</sup>[Internet World Stats](#)

## E. E-government

2.27. The delivery of government services electronically is a major driver of broadband take-up, and is particularly important in periods of austerity where there are pressures on government finances. Figure 11 illustrates the proportion of the population interacting electronically with public authorities via platforms in 2012.

Figure 11: Electronic interaction by individuals with public authorities, 2012

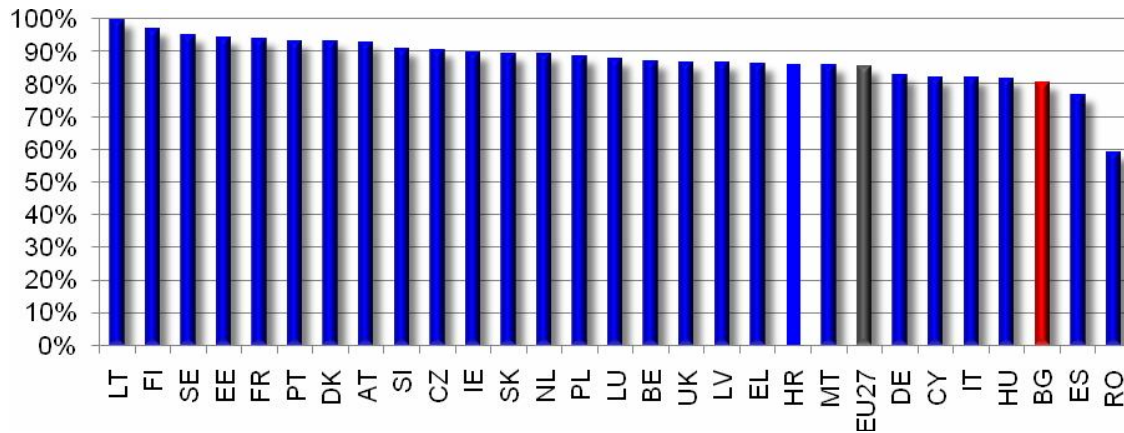


Source: European Commission.

2.28. In Bulgaria, 27% of citizens interacted electronically with public authorities, with 11% sending filled-in forms, whereas the EU averages are 44% and 22% respectively. The DAE target for e-government and returning forms is 25% by 2015. Noticeably, Denmark, who holds the leading position, was an early adopter of e-government services, and therefore has a low “never used” proportion, high e-commerce by citizens and high levels of penetration.

2.29. However, the proportion of SMEs in Bulgaria interacting with public authorities on-line, at 83% close to the EU average of 87%, is very much higher (more than 3 times) than the proportion of citizens interacting, as Figure 12 illustrates. This level of interaction implies much greater access to broadband networks and relevant platforms among Bulgarian business than Bulgarian households. Such an outcome is to be expected since business customers are more attractive to network operators than are household/residential customers.

Figure 12 Take up of e-government by SMEs



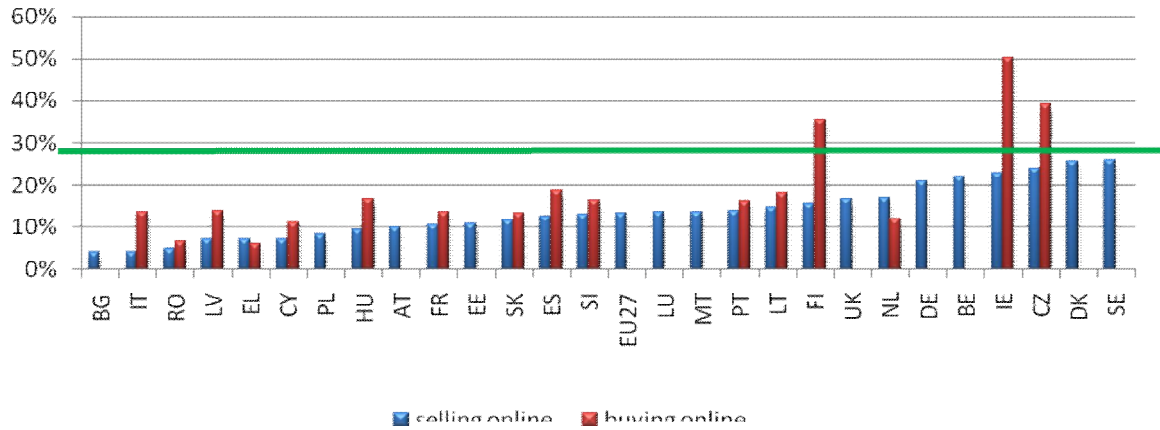
Source: European Commission.

## F. E-commerce

2.30. E-commerce is central to the internet economy and a driving factor behind broadband take-up and the realization of earnings from investments in the broadband business. The DAE target is for 33% of SMEs to be selling on-line. Figure 13 presents limited data on the participation of SMEs buying and selling on-line for 2012. On-line selling by Bulgarian SMEs appears to be in its infancy.

2.31. In fact, in 2012 Bulgaria had the lowest percentage of all enterprises engaging in e-commerce (4%), with respect to an EU average of 14%. Only 4% of SMEs engaged in e-Commerce in 2012, while the EU SME average was 13%. 4% of Bulgarian companies purchased online in 2012 (down 2 percentage points, over 2011), while the EU average was 16%. The figure for enterprises' turnover achieved through e-Commerce in 2012 was 3%, well below the EU average (15% in 2012). According to the E-Commerce Report 2013 B2C for Albania, Belarus, Bosnia Herzegovina, Montenegro, Bulgaria, FYR Macedonia, Kosovo, Moldova, Romania, Russia, Serbia, Ukraine and Russia amounted to €13.4 billion with Russia accounting for €10.3 billion. The comparative figure for the UK was €96 billion.

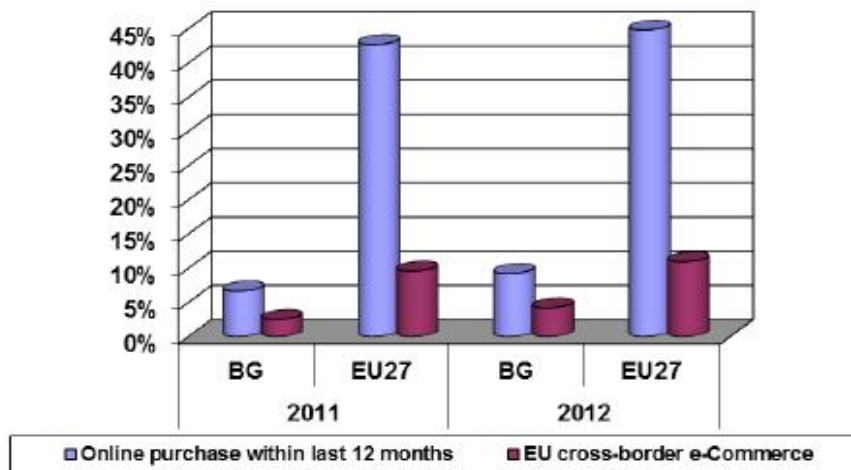
Figure 13: E-commerce: SMEs



Source: European Commission.

2.32. Figure 14 presents data regarding on-line and on-line cross-border purchasing by citizens in 2012, where the DAE targets are 50% and 20% respectively by 2015. 9% of Bulgarians purchased goods or services online within the last 12 months in 2012, below the EU average of 45%, but the figure was up by 2 percentage points since 2011. 4% of the population bought online from other EU countries, and 7% purchased online from national sellers (some having done both). The EU averages are 11% and 41% respectively.

Figure 14: e-Commerce activities of individuals



Source: European Commission.



2.33. Lack of trust, infrastructure and take up, thereby restricting access to platform, together with an e-commerce culture are only a few of the reasons why citizens in Bulgaria do not participate in online shopping. The same factors probably contribute to the low level of on-line selling by Bulgarian SMEs. However, a significant shift to e-commerce would not only strengthen the market players, but also the payments and delivery sectors. Given the roles of SMEs and e-commerce in economic growth and competitiveness this state of affairs may represent an important impediment to the expected benefits of 3S. The low level of broadband take-up (including mobile) is a contributory factor since this implies limited access of customers to platforms.

## **G. ICT for e-Skills and Competitiveness**

2.34. The evolving environment changes the nature of skills required of the workforce. There is an across the board increased demand for skills related to ICT and science, technology, engineering and mathematics (STEM). For instance, auto repair workers need these skills since diagnostics are performed using computers. At the same time there is an enhanced demand for creative skills since these technologies provide for greater creative opportunities and where creative content is a means of differentiating products and services. One estimate of the importance of these skills is that there are 5 jobs for every IT position.<sup>16</sup>

2.35. While the ICT is one of the most developed sectors in Bulgaria, there is a high proportion of citizens that have never used the internet (and have no e-skills) and the relatively low levels of ICT and computer skills combined. According to the Digital Agenda for Europe (DAE) framework, over 40% of Bulgarian households that don't have access to internet found the lack of skills as one of the most important barrier with lack of interest being cited by 10% of respondents. It is possible that the majority of the never used group are made up of the ageing population in rural areas and the low level of inclusion of ethnic minorities. Based on Eurostat data, over 10% of the population in Bulgaria has high computer skills compared to the EU average above 25%, while less than 10% of the population has high internet skills compared to the EU average of over 10%. The internet users of Bulgaria are four and a half years behind the EU average in terms of diversification of their online behavior<sup>17</sup>.

2.36. Since the education system is the raw material of innovation, it is also noteworthy that the number of computers in schools per 100 students is relatively low (see Chart D in Annex 1). According to the EC survey of schools in 2011-12 for 8th grade students, on average there were 5 students for each computer in the EU and 8 in Bulgaria. Regarding students per internet connected laptop the EU average was 7 with 13 in Bulgaria, and for laptops 14 in the EU and 125 in Bulgaria. But in Bulgaria broadband speeds at all grades were higher than in most other countries, and only between 4% and 5% of students, depending on grade, are in schools without broadband. These speeds reflect well on the underlying broadband coverage.

2.37. Figures 15 to 17 relate to the competitiveness of the Bulgarian workforce is measured by the proportion of population with "high computer skill", "high internet skills" for 2011 (Figure 15), the spread of computer skills compared to EU averages for 2012 (Figure 16) and the proportion of the ICT

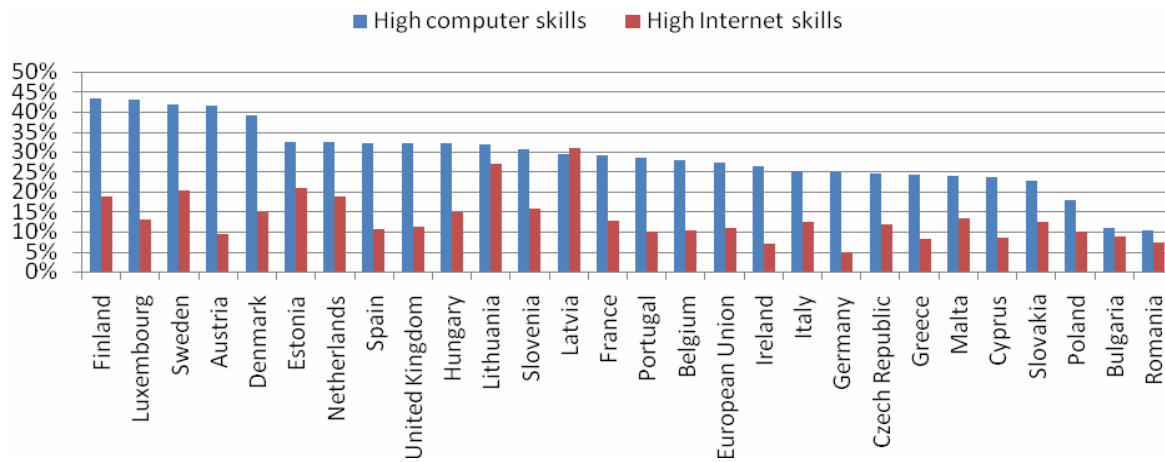
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<sup>16</sup>Philip Bond, "Tech Provides Map for Nation's Future," Politico, September 18, 2011.

<sup>17</sup><https://ec.europa.eu/digital-agenda/enhancing-digital-literacy-skills-and-inclusion-analysis-and-data>

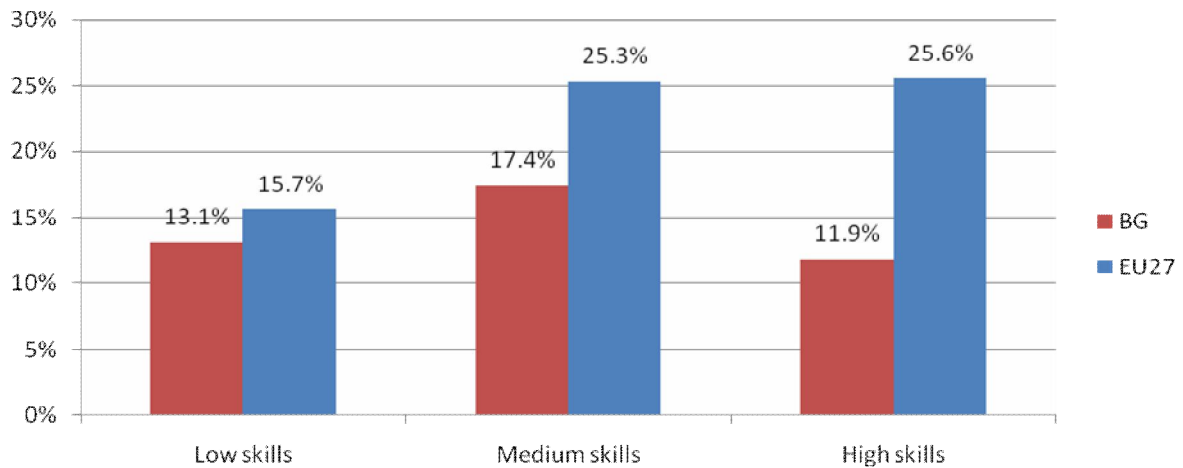
professionals in the workforce (Figure 17). Just over 10% of the population in Bulgaria have high computer skills compared to the EU average above 25% while less than 10% of the population have high internet skills compared to the EU average of over 10% that demonstrates a link to the regularity of use of the internet.

Figure 15: Skill levels in the workforce 2011



Source: European Commission.

Figure 16: Levels of computer skills, 2012

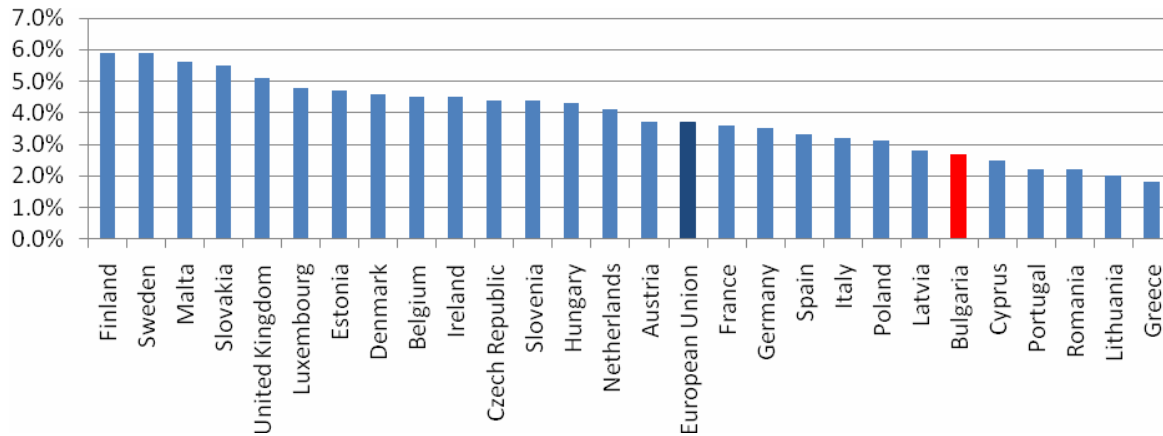


Source: European Commission.

2.38. The share of ICT professionals in the total workforce in 2011 in Bulgaria was around 2.7% with the EU average around 3.7%. Again, there are likely to be links here to frequency of ICT use, broadband take-up, access to platforms and the development of on-line markets.

2.39. A strategic document issued in 2012 by a working group representing Bulgaria’s software industry calls for a reform in the education system that would introduce a competency approach in primary and high school education. This approach integrates knowledge, skills, attitude and values in the behavior that lead to good implementation results. The document is having an impact on policy makers because it addresses the long-term issue of lack of skills and knowledge in the workforce.<sup>18</sup>

Figure 17: Share of ICT professionals from the total workforce in EU27, 2011



Source: European Commission.

2.40. To summarize, Chapter 2 points to the following main challenges that Bulgaria must overcome on the path toward the digital growth and knowledge economy: the low levels of take-up in general, the low levels of rural coverage, the high proportion of citizens that have never used the internet (and have no e-skills), the very restricted participation of Bulgarian businesses and citizens in e-commerce and the relatively low levels of ICT and computer skills available. The review of the data relating to the DAE scoreboard indicates that in Bulgaria:

- Broadband coverage is near the EU average and close to the DAE target
- Rural broadband coverage is below the EU average
- NGA broadband coverage is above the EU average
- Broadband penetration/take up is below the EU average
- Data rates of the coverage are below DAE targets
- SME participation in on-line markets is low
- The proportion of enterprise turnover from e-commerce is very low
- Citizen participation in on-line markets is low
- Half the population are regular internet uses
- More than 40% of citizens have never used the internet
- A low proportion of citizens are returning forms on-line to public authorities
- A high proportion of businesses interact with public authorities on-line

<sup>18</sup>The strategic document is available in Bulgarian at <http://basscom.org/requirements.aspx>.

2.41. Table 3 below summarizes the DAE scoreboard performance with associated target completion dates by comparing the performance in Bulgaria to overall EU progress based on the latest figures available. These interrelated indicators have ramifications for the 3S, smart sustainable and inclusive growth as well as innovation and competitiveness.

Table 3: DAE scoreboard performance of the EU and Bulgaria

Target	Date for completion	EU Progress %	Latest status in Bulgaria %
>30 Mbps coverage for all	2020	54	>30
50% HH take up >100 Mbps	2020	2	<1
33% SME selling on-line	2015	13	4
20% Pop buying X-border on-line	2015	11	<3
50% Pop buying on-line	2015	45	6
75% Pop regular internet users	2015	70	50
15% Pop never use internet	2015	20	42
50% Pop using e-government	2015	44	27
25% Pop using e-gov and returning forms	2015	22	11
Broadband coverage for all	2013	95.5	>90

Source: European Commission.

## Chapter 3: Institutions and Infrastructure for Digital Growth

### A. ICT Institutional Framework: Policy and Regulation

3.1. The Ministry of Transport, Information Technology and Communications<sup>19</sup> (MTITC) has a sizeable portfolio. It is responsible for the physical transport system, managing substantial assets in the transport sector including 16 companies (e.g. the State Railway Holding and Sofia Airport EAD), which are majority state-owned, as well as 5 wholly state-owned companies (e.g. the Port Infrastructure). As a consequence, MTITC has a knowledge and possible control of important infrastructure, such as ducts, access to which is essential for a rapid broadband roll out project. MTITC is also responsible for IT, e-governance and through the Directorate for Communications, electronic communications, some aspects of postal services and radio spectrum.

3.2. Work is well advanced on Digital Agenda for Europe and the development of the Information Society in Bulgaria in the National Programme for Digital Bulgaria 2015 which was adopted in 2012, the National Strategy for the Development of Broadband Access in the Republic of Bulgaria by 2020 and the National Operational Plan for the implementation of strategic goals concerning the deployment of broadband access in Bulgaria which have been updated. Additionally the “Development of fast broadband access in Bulgaria by developing critical, secure, safe and reliable public ICT infrastructure“ was launched under OPRD in May 2012, and an official state aid notification was sent to the European Commission in February 2013, although state aids clearance is still pending.

3.3. In November 2009 the Council of Ministers of Bulgaria adopted a National Strategy for the Development of Broadband, drafted by MTITC, as required by the EU. The strategy, with MTITC providing co-ordination of implementation, held as its central vision that “by 2013 all Bulgarian citizens should have the possibility for broadband access.” It is very likely that this vision has been achieved, except in rural areas. In 2010 MTITC published a concept paper to address the rural issue with the intention of part funding investment through EU Regional Development Fund 2007-13.

3.4. The 2009 strategy also had as an objective “To facilitate the innovative use of broadband by business to improve processes, employ new business strategies, access new opportunities and deliver enhanced services to end-users.” This objective is a key contributor to 3S but it does not seem that businesses have picked up this facility. In 2012 the Strategy and implementation plan were updated by MTITC.

3.5. There are clear advantages from having a single organisation with responsibility for the ICT sector as long as the organisation has sufficient resources to fulfil all of its tasks. The Communications Regulation Commission<sup>20</sup> (CRC) is the responsible independent regulator. CRC “implements state policy in the field of telecommunications and postal services ...CRC strives to promote the competition of the telecommunications market ... aiming at the increase of sector investments, the new technologies’

<sup>19</sup><http://www.mtita.government.bg/index.php>

<sup>20</sup><http://www.crc.bg/index.php?lang=en>

development and the protection of end users.” CRC is aided in these tasks by a set of legal instruments that are compliant with all relevant EU legislation, including the revisions of the 2009 EU Telecommunications Framework.

3.6. CRC has been delivering key decisions to enable competition in the services market, for example the recent Decision No. 195 (03/2013) which provides wholesale access to Vivacom’s network on reasonable terms while preventing any margin squeeze on competitors. It also includes the obligation on the company to provide “internet functionality”.

3.7. As is the case elsewhere, it is possible that these institutions could behave in a more pro-active manner by adopting measures similar to those of the draft “Proposal for a Regulation of the European Parliament and of the Council on measures to reduce the cost of deploying high-speed electronic communications networks” of 26th March 2013<sup>21</sup>. Civil engineering, such as the digging up of roads to lay down fibre, accounts for up to 80% of the cost of deploying high-speed networks. The proposed measures are designed to cut by 30% the cost of rolling out high-speed internet by:

- Ensuring that new or renovated buildings are high-speed-broadband-ready;
- Opening access to infrastructure on fair and reasonable terms and conditions, including price, to existing ducts, conduits, manholes, cabinets, poles, masts, antennae installations, towers and other supporting constructions;
- Ending insufficient coordination of civil works, by enabling any network operator to negotiate agreements with other infrastructure providers;
- Simplifying complex and time-consuming permit granting, especially for masts and antennas, by granting or refusing permits within six months by default and allowing requests to be made through a single point of contact.

3.8. In this regard Bulgaria has already set a maximum period of six months for issuing construction permits for electronic communications infrastructure that is, is already “best in class”. MTITC as previously noted is an important player in the infrastructure of bullet 2 and the early implementation of bullet 2 may be particularly beneficial in rural areas. It is recommended that the authorities adopt the other 3 measures in 2013.

## **B. Broadband Infrastructure: Improving Rural Access to Broadband**

3.9. Broadband is a ‘general purpose technology’ that supports product and process innovation by changing the way existing services are delivered or accessed. An action plan to bring about complete rural coverage would have sizeable macroeconomic consequences. A large number of OECD countries have included broadband roll out as an element of their “stimulus package”. The multiplier effect would be fairly high since there would be few external “leakages”, tax revenues would rise and unemployment costs fall.

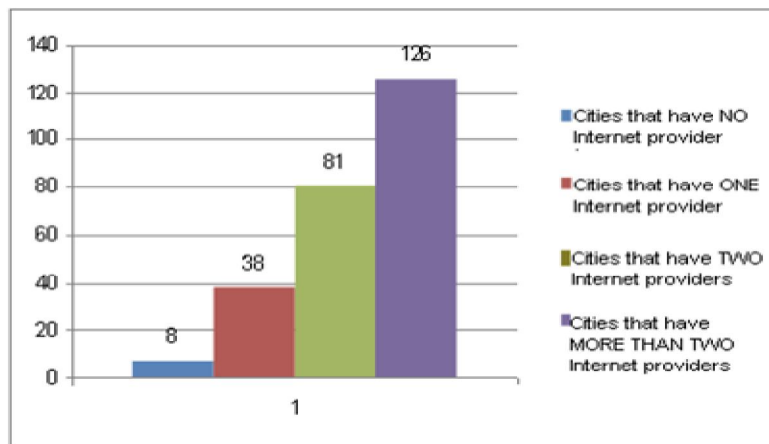
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<sup>21</sup><http://ec.europa.eu/digital-agenda/en/news/proposal-regulation-european-parliament-and-council-measures-reduce-cost-deploying-high-speed>

3.10. MTITC already has an experience in these types of projects as explained in “Concept for Development and Render for Maintenance and Operation of Regional Broadband Access Networks in Less Urbanized and Rural Areas”, MTITC, 2010, (the “Concept” Paper). Since then certain clarifications have emerged e.g. on State Aids, many rural projects have been implemented across the EU and elsewhere and business models have been refined so that rural projects in Bulgaria can draw on these experiences.

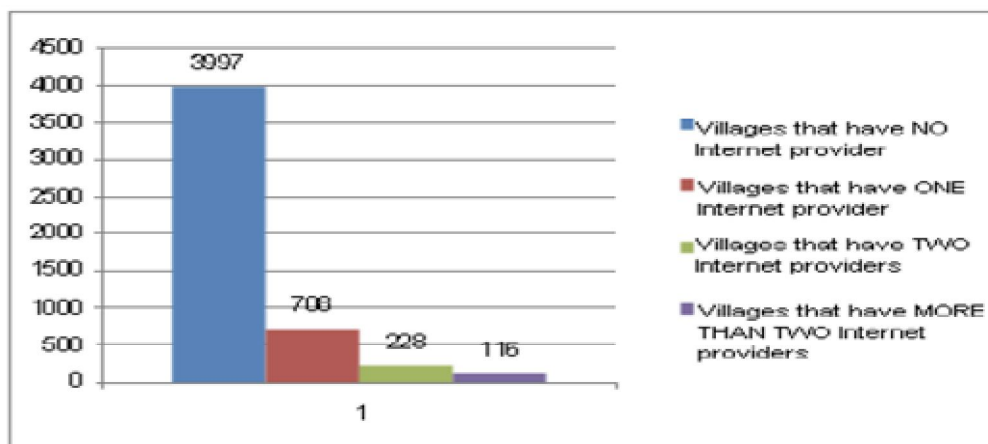
3.11. The “Concept” paper illustrates the size of the supply-side challenge. Figures 18 and 19 are taken from the paper using data supplied by the CRC. They illustrate the distribution of internet providers between cities and villages. In 2008 there were 8 cities and nearly 4,000 villages with no internet provider and 38 cities and 700 villages with only one provider – these circumstances are import for State Aid issues as they indicate the intensity of competition in markets.

Figure 18 Number of internet providers in cities, 2008



Source: Government of Bulgaria. Concept for Development and Render for Maintenance and Operation of Regional Broadband Access Networks in Less Urbanized and Rural Areas. MTITC, 2010.

Figure 19: Number of internet providers in villages, 2008



Source: Government of Bulgaria. Concept for Development and Render for Maintenance and Operation of Regional Broadband Access Networks in Less Urbanized and Rural Areas. MTITC, 2010.

3.12. The need for access to broadband in rural areas is at least as great as the needs in urban areas, but due to their lower population densities and disposable GDP per capita, the private sector does not respond and the needs of rural area go unmet. The impact of such e-exclusion (of nearly 4,000 villages across the country) is clearly evident as it makes these areas more remote, less dynamic, with declining competitiveness and diminishing attractiveness to investors and citizens. All the beneficial consequences of broadband usage discussed above are absent in these rural areas. There are long-term consequences of e-exclusion which assume the characteristics of a vicious circle. For instance, recent research in the UK has concluded that the exam results of a million children will be on average a grade lower than their peers, because they do not have internet access at home.

3.13. In the face of such a clear market failure, there is a particular role for public finance working together with local authorities and regions as well as in partnership with the private sector. This role has been recognized by the EU<sup>22</sup> and MS. Funding from the EFRD/CF have been applied to this issue. The EC has reported as of 2011 that these funds had brought broadband to an extra 1.9 million people though none of these were in Bulgaria<sup>23</sup>, and that nearly 400,000 gross jobs were created, of which 1,647 were in Bulgaria.

3.14. It is important to engage the private sector, particularly the large number of broadband operators, to take urgent action. It is for them to find paying customers, entice the ‘never used internet’ citizens, provide the access to compelling content to stimulate ICT literacy and encourage SMEs to be active in e-commerce. The private sector must act to gain returns from their investments. It is also the responsibility of the private sector to take advantage of opportunities such as the forthcoming ICT Innovation Vouchers targeted at SMEs.

3.15. The new Connecting Europe Facility (CEF) with a budget of around €30 billion for the period 2014 to 2020 will provide financial support for those projects identified in the Sectoral Guidelines (transport, energy, broadband and e-services) that cannot be financed fully by the market. CEF is expected to leverage additional private funds. Similarly, Horizon 2020 with a budget of €70 billion will be the financial instrument used over the same period to support the Innovation Union, which necessarily includes support for ICT related activities as well as SMEs.

3.16. Consequently, there are opportunities for the Bulgarian authorities, drawing on their recent experiences and those of others, to prepare during the rest of 2013 both for ERDF/CF and for the opening of these 2 new financial instruments so that they can “hit the ground running”. Preparing for and monitoring forthcoming instruments is highly recommended.

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<sup>22</sup><http://ec.europa.eu/digital-agenda/funding-opportunities> In 2010, the Commission injected up to € 1.02 billion into the European Agricultural Fund for Rural Development (EAFRD) for deployment of broadband infrastructures in rural areas.

<sup>23</sup>[http://ec.europa.eu/regional\\_policy/how/policy/doc/strategic\\_report/2013/factsheet2\\_ict\\_infrastructure\\_services.pdf](http://ec.europa.eu/regional_policy/how/policy/doc/strategic_report/2013/factsheet2_ict_infrastructure_services.pdf)



## C. State Aids

3.17. While there is a need for public finance, these interventions or State aids must not distort competition. It is the responsibility of the Granting/Managing Authority in Bulgaria (the organization which manages public finance interventions including the use of EU funds) to ensure such interventions are compatible with state aids regulations before seeking approval from the EC.

3.18. The EC monitors the investment of public funds to ensure that State aid is not used to unduly favor one or more private entities in a way that would distort a market. The key activities for achieving compliance with State aid regulations relate to justifying the need for public intervention. However, there are 4 sets of circumstances where a State aid notification is not required. These are if the:

- investment is made on terms that are equivalent to those available to the market
- level of aid is below a threshold of EUR200 000
- broadband network is only used for public services
- broadband project is being implemented as part of a national framework scheme which has already received State aid approval

3.19. This implies that elaborating a national framework and gaining approval of it for State aid purposes is much more efficient than a piecemeal case by case approach. It is strongly recommended that if the current National Strategy for the Development of Broadband does not gain State aids approval in the very near future, it is revised to fulfill this objective. This will involve applying the principles and best practices to a set of questions outlined below.

3.20. In December 2012, the EC adopted revised guidelines (updating those of 2009) for the application of EU State aid rules to the broadband sector in support of the objectives of the DAE. As of mid-May 2013 the EC had made 120 decisions<sup>24</sup> supporting broadband projects<sup>25</sup>, including 21 decisions in 2012 amounting to over €6.5 billion. The list of 120 decisions does not contain any project approved in Bulgaria.

3.21. The new guidelines are based on the following principles that were largely applied by MTITC and the Executive Agency “Electronic Communication Networks and Information Systems” in the 2010 pilot schemes outlined in the concept paper:

- *Technological neutrality*: the new guidelines take into account technological advances, acknowledging that super-fast (Next Generation Access) networks can be based on different technological platforms.

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<sup>24</sup>[http://ec.europa.eu/competition/sectors/telecommunications/broadband\\_decisions.pdf](http://ec.europa.eu/competition/sectors/telecommunications/broadband_decisions.pdf)

<sup>25</sup>Where the EC either found there was no state aid or raised no objections to the project.

- *Ultra-fast broadband networks*: to help achieve the DAE objective of delivering very fast connections (of more than 100 Mbps) to half of European households by 2020, the revised guidelines will allow public funding also in urban areas but subject to very strict conditions to ensure a pro-competitive outcome.
- *Step change to connectivity*: to protect private investors, the guidelines require that any public investment must fulfil a so-called “step change”: Publicly financed infrastructure can only be allowed if it provides a substantial improvement over existing networks and not only a marginal improvement in citizens’ connectivity.
- *Reinforcement of open access*: when a network is realised with taxpayers' money, it is fair that the consumers benefit from a truly open network where competition is ensured.
- *Transparency*: new provisions regarding the publication of documents, a centralised data base for existing infrastructure and ex post reporting obligations to the Commission have been introduced.

3.22. In the 2009 Guidelines the EC introduced, and the 2012 Guidelines maintained, a simplified approach to determine the necessity of the State aid measures, distinguishing between areas where:

- broadband infrastructure does not exist or is unlikely to be developed in the near term<sup>26</sup> (white areas)
- only one broadband network operator is present (grey areas) and
- at least two or more broadband network providers are present (black areas)<sup>27</sup>.

3.23. Clearly, the majority of Bulgarian villages fall into “white areas”. Furthermore, in areas where it is only possible for a single broadband network to be economically viable it is essential to promote competition at the level of service provision, which requires open access.

3.24. The best practice in State aid measures for broadband entails several conditions (see Annex 2 for a thorough primer). For general compatibility, criteria for approval include:

- Detailed mapping and coverage analysis (this is also a key DAE activity)
- Open tender process
- Most economically advantageous offer
- Technological neutrality

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<sup>26</sup>In the next 3 years.

<sup>27</sup>It should be noted that if in an area there are competing dial-up operators but no NGA operators the area may be considered as “white”.

- Use of existing infrastructure<sup>28</sup>
- Wholesale access
- Price benchmarking
- Claw back mechanism.

3.25. For specific compatibility the criterion for NGA networks involves

- Access obligations e.g. ‘open access’.

3.26. It’s important to note that this process of assessing criteria would have to be repeated for each individual project unless the individual project is being implemented as part of a national framework scheme which has already received State aid approval. In this entire process there is a considerable role for National Regulatory Authorities (CRC and the Competition Authority). CRC has sector specific duties such as approving wholesale tariffs and ensuring access obligations are met. Either or both authorities may be involved in the tendering process.

3.27. The revision of the National Strategy for the Development of Broadband, if necessary, should take account of the above principles and best practices for the purposes of a single State aids approval. In order for the Bulgarian authorities to improve access to broadband in rural areas using some measure of public finance it is necessary to address 7 key questions and respond to them using the principles and best practices outlined above. This will initiate the State Aids approval. MTITC and the Executive Agency have already begun to address these questions:

1. Why should I invest in broadband?
2. What type of network infrastructure should I invest in?
3. How should I invest?
4. How do I manage/monitor the outcome?
5. What can be done to ensure demand for services?
6. What can be done to reduce the cost and manage risks?
7. What are the next steps that need to be taken?

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<sup>28</sup> An area where MTITC has a particular role to play.

## D. Investment Models

3.28. The European Investment Bank<sup>29</sup> and the EC working with Analysis Mason<sup>30</sup> have identified 5 investment models, illustrated in Figure 20, as having potential for rural broadband projects. Different models suit different circumstances so that each of them could be used somewhere in rural Bulgaria. Each of them is a form of Public-Private Partnership (PPP) though the bottom-up model tends to be community based, but may include local businesses. The EC has described the 5 models in the following terms.

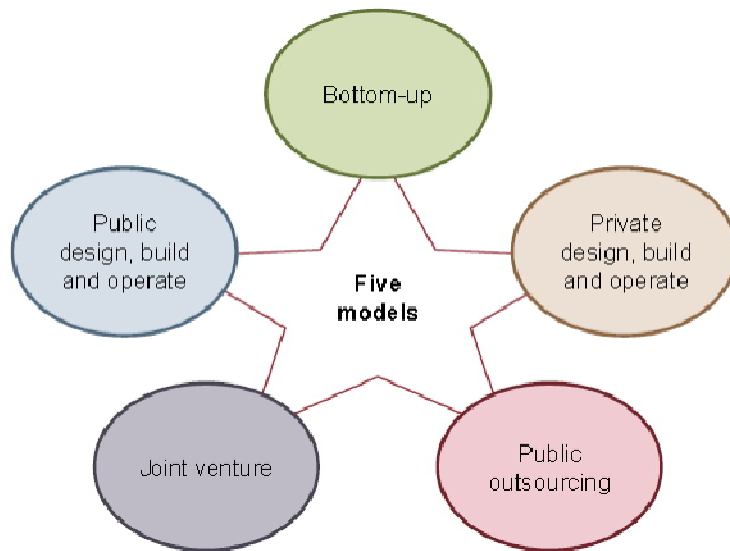
- Bottom-up model. The bottom-up, or local community, model involves a group of end users organizing themselves into a jointly owned and democratically controlled group (frequently a co-operative) capable of overseeing the contract to build and operate their own local network.
- Private design, build and operate (DBO) model. The private design, build and operate (DBO) model involves the Granting/Managing Authority issuing funding (often in the form of a grant) to a private sector organization to assist in its deployment of a new network. The public sector has no specific role in the ownership or running of the network, but may impose obligations in return for the funding.
- Public outsourcing model. Under a public outsourcing model a single contract is awarded for all aspects of the construction and operation of the network. The major characteristic of this model is that the network is run by the private sector, but the public sector retains ownership and some control of the network.
- Joint venture model. A joint venture is an agreement under which ownership of the network is split between the public and private sector. Construction and operational functions are likely to be undertaken by the private sector.
- Public design, build and operate model. A public DBO model involves the public sector owning and operating a network without any private sector assistance. All aspects of network deployment are managed by the public sector. A public sector operating company may operate the entire network, or may operate the wholesale layer only (with private operators offering retail services).

Figure 20: Five Investment Models for Broadband Projects

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<sup>29</sup> See [http://www.eib.org/epec/resources/epec\\_broadband\\_en.pdf](http://www.eib.org/epec/resources/epec_broadband_en.pdf) for case studies and on using EU funds in PPP see <http://www.eib.org/epec/resources/epec-using-EU-funds-in-ppps-public.pdf>

<sup>30</sup> See [http://ec.europa.eu/regional\\_policy/sources/docgener/presenta/broadband2011/broadband2011\\_en.pdf](http://ec.europa.eu/regional_policy/sources/docgener/presenta/broadband2011/broadband2011_en.pdf)



Source: European Commission

3.29. Further the EC has identified, in the last cited report, the advantages and disadvantages of these models as the following table:

Table 4. Investment models: advantages, disadvantages and recommended use

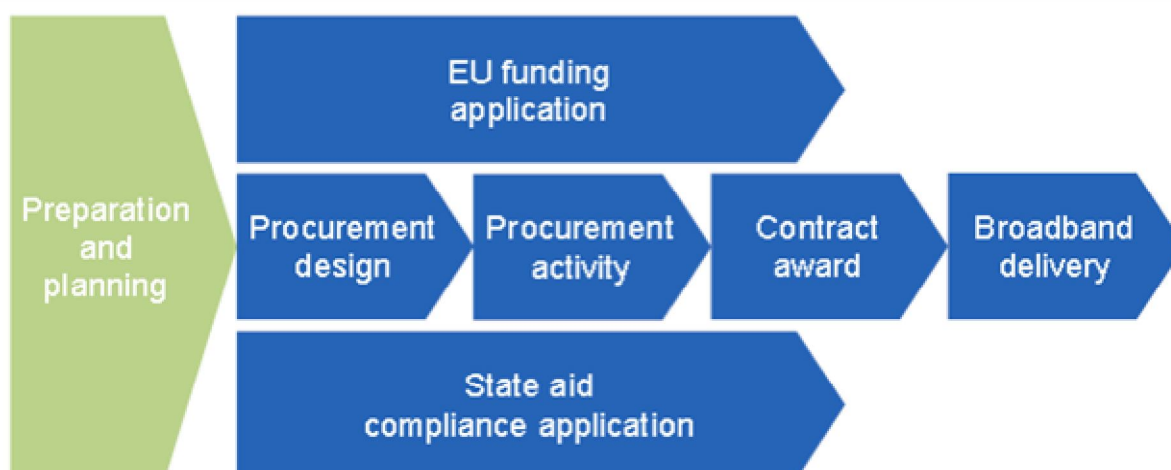
Model	Advantage	Disadvantage	Recommended Use
<b>Bottom up</b>	Long-term, non-profit view, suitable for high cost infrastructure (e.g. FTTH)	Localised deployments, with risk of differing technologies	For targeting localised areas and for gaining the most benefit from small amounts of funding
	Focuses demand and encourages local social cohesion		
<b>Private DBO</b>	Larger scale (than bottom up)	There is a minimum funding threshold to attract private interest	For larger-scale investments, where sufficient funding is available to attract private interest in rural areas, and where the operations (and risk) of the network can be confidently transferred to a private operator
	Low public burden, which can lead to faster deployments	Limited control over operations, which may reduce the socio-economic impact	
<b>Public outsourcing</b>	Public financial stability with private expertise	Reduced financial benefit to private sector (compared to private DBO)	Where the Granting/Managing Authority requires a high level of control over the network, and where the private operator has a more conservative risk profile than the private DBO model
	Greater control (than private DBO)	Additional bureaucracy	
<b>Joint venture (JV)</b>	Potential financial benefit for both parties, based on risk sharing	Potential conflicts of interest must be resolved and may block creation/successful operation of the JV	Where the interests of the public and private sectors can be closely aligned
	The creation of special-purpose vehicles (SPVs) can make the model very scalable, and allow alternative investment sources	Few examples of implemented JVs to indicate best practice	
<b>Public DBO</b>	Granting/ Managing Authority has full control to promote competition and enforce standards	Size and scope limited by public expertise	Where a Managing Authority need to have absolute control over the operations of the network, or where small targeted investment will inspire investment from private sources
	Granting/Managing Authority can ensure socioeconomic benefits are prioritised	Potentially excludes private sector expertise	

Source: European Commission

3.30. The report<sup>31</sup> also provided the template flow chart, which demonstrates that activities directly related to project e.g. procurement design, can take place simultaneously with the applications for the EU funding and State aid approval. The contract cannot be finalized prior to the response to these applications unless the broadband project is being implemented as part of a national framework scheme which has already received State aid approval.

3.31. It is important that in the preparation and planning phase, the applications for funding and approval are also prepared for and planned. The mapping exercise required of the state aids clearance, plus answering the 7 key questions listed earlier and applying them to the different business models are held to be vital DAE activities. It is strongly recommended that the mapping exercise of existing broadband infrastructure is completed in 2013 and that a meaningful schedule is established for the rural broadband project based on the below project flow chart.

Figure 21: Project Flow Chart



Source: European Commission

## E. E-government through e-Procurement for Bulgaria

3.32. Substantial progress has been made in the establishment of e-government services<sup>32</sup>. As the Ministry of Finance stated in April 2013 in the National Reform Programme Update: "...two comprehensive and integrated projects are underway under OPAC33, in the framework of which 30 main registers have been connected by March 2013, and over 100 electronic services for citizens and businesses will be launched by May 2013" (Measure CSR5-D1). Also, a register of electronic IDs and a user ID management system for users of electronic administrative services will be set up, to come live following the adoption of legal regulation of e-service provision. A centralized system for electronic public inquiries has been developed which will enable citizens and businesses to participate in real time in the process of decision-making, along with systems ensuring secure information storage. The upgrade of the national e-government portal with the addition of the Single Contact Point [SPC] functionality has

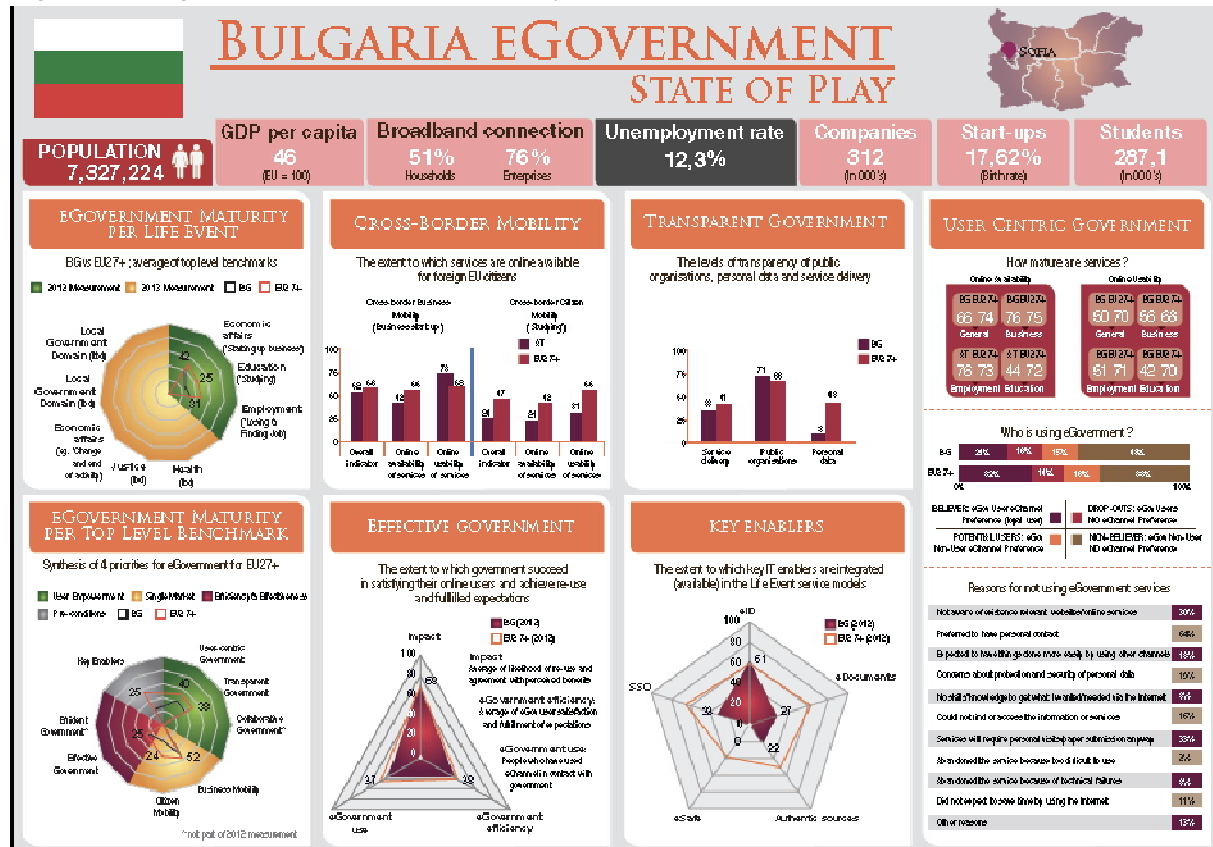
<sup>31</sup>[http://ec.europa.eu/regional\\_policy/sources/docgener/presenta/broadband2011/broadband2011\\_en.pdf](http://ec.europa.eu/regional_policy/sources/docgener/presenta/broadband2011/broadband2011_en.pdf)

<sup>32</sup>See also <http://www.opengovpartnership.org/countries/bulgaria>.

been completed, and by 2015 all stages of deployment will be completed, enabling the provision of electronic services in the meaning of the Law on Service Provision Activities.

3.33. On 28th May 2013 the EC published its e-government benchmarks for 2012<sup>33</sup>. The state of play of e-government in Bulgaria in comparison to the EU 27+ is shown in Figure 22.

Figure 22: Bulgaria e-Government: State of Play



Source: European Commission

3.34. These rich and complex benchmarks are based on a very large sample of citizens across the EU27+. They show that 46% of EU citizens go on-line to look for a job, use the public library, file a tax return, register a birth, apply for a passport or use other e-government services. 80% of the users respond that on-line public services save them time, 76% like the flexibility and 62% say they save money. However, users are more satisfied with on-line banking (8.5 satisfaction rating on a scale of 0 to 10), and on-line shopping (7.6) than with public services online (6.5).

<sup>33</sup> <https://ec.europa.eu/digital-agenda/en/pillar-7-ict-enabled-benefits-eu-society>  
[https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/eGov\\_Benchmark\\_2012%20background%20report%20published%20version%200.1%20.pdf](https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/eGov_Benchmark_2012%20background%20report%20published%20version%200.1%20.pdf)



3.35. Generally, though there are exceptions, e-government performance in Bulgaria is below the EU 27+ average, is less mature and some key enablers are not in place. For example Bulgaria is ahead of the EU27+ average on e-ID but behind on all other enablers particularly e-Safe Bulgaria outperforms EU27+ average regarding transparency and public organizations (an indication) but behind with other aspects of transparency.

3.36. The sample results for Bulgaria show 45% of citizens have never used the internet compared to the EU 27+ average of 28%. Also less than 20% of the respondents in Bulgaria had used e-government service compared to the EU 27+ average of 25%. The results show that 21% of respondents in Bulgaria are “believers” with the EU 27+ average at 32% and 48% are non-believers compared to the EU27+ average of 38%. However a high proportion of businesses interact with government on-line meaning they are users and believers. The key issue is the high proportion of non-believers among the general citizenry. The challenge is to provide the incentives that convert non-believers to stalwart believers and users by addressing the demand side.

3.37. The value of e-government is well recognized in Bulgaria though the range and depth of services available on-line is not among the MS leaders who are moving to Digital by Default, Open Government Data, M&E and Open Access systems. One recommendation for providing momentum to the take up of e-government services in Bulgaria is to accelerate the full switch over by government to e-procurement and e-invoicing by default. Both e-procurement and e-invoicing are key tools contributing to the rationalization of public expenditure and making the public administration more efficient. This momentum would harness digital growth opportunities. Since such a system would have to be non-discriminatory, it means that all businesses must be able to engage with the procurement process on-line. Consequently broadband has to be available in rural areas.

3.38. Public sector organizations (state owned companies, local, regional and national authorities depending on administrative structures) use e-procurement primarily for contracts to achieve benefits such as increased efficiency and cost savings (faster and cheaper) in government procurement and improved transparency (to reduce corruption) in procurement services. However, the process has significant consequences for suppliers.

3.39. A switch over to e-procurement and e-invoicing by default would have a dramatic impact on the business sector since the government is the single largest buyer in Bulgaria, its purchases representing a large proportion of GDP. The government has a buying power estimated to be €2.3 billion in 2010 by the EC<sup>34</sup> for above threshold purchases by over 3,000 managing agencies.

3.40. The Czech Republic recognized its spending power at an early stage (currently estimated at over €8 billion). The "e-trziste" electronic marketplace program both helped to streamline the government procurement process, and as a consequence to energize e-commerce: A survey in June 2003 found that 32% of Czech businesses procured online — Central Europe's highest proportion. As of 2012 large enterprises in the Czech Republic earned 33% of their turnover from e-commerce (6% in Bulgaria). The proportion for SMEs was 15% (1% in Bulgaria). 42% of large enterprises (6%) and 24% of SMEs (1%) were selling on-line. All of these results outstripped the EU averages.

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<sup>34</sup>[http://ec.europa.eu/internal\\_market/publicprocurement/docs/implementation/20121011-staff-working-document\\_en.pdf](http://ec.europa.eu/internal_market/publicprocurement/docs/implementation/20121011-staff-working-document_en.pdf)

3.41. The various components of e-procurement are listed in Annex 3. The factors, which support the development of e-government include:

- Connectivity and technology infrastructure (hence the priority for rural broadband projects)
- Government policy and vision
- Supporting Business and legal environment
- Education and skills
- E-democracy
- Online public services for citizens
- Online public services for businesses

3.42. All of these factors are well understood by Bulgarian authorities. As already noted, progress has been made in the provision of e-government services – including e-procurement. The basic legal framework is provided at the European level, for example the public procurement and more recent e-invoicing Directives, which are transposed into Bulgarian law. On 26th June 2013 the Commission presented its draft directive on e-invoicing in public procurement<sup>35</sup> which would make e-invoicing the default position for public procurement. Bulgaria has the opportunity to be in a leadership role by moving quickly on e-invoicing for its public procurement.

3.43. But in Bulgaria there are a high proportion of non-believers among the general citizenry who do not take up the e-government offerings. Businesses interact on line but do not trade on line while e-procurement is at low level. Actions are urgently required to:

- Provide the incentives that convert non-believers to stalwart believers and users by addressing the demand side
- Expand e-commerce substantially from its low base to capture digital growth
- Expand e-procurement massively to access the benefits of the Digital Agenda

3.44. There is no silver bullet, but an early switch over by the Government of Bulgaria to e-procurement as the default position would massively expand e-procurement, thereby substantially expanding e-commerce and capturing digital growth. This initiative would create a critical mass for the digital services in Bulgaria so providing the incentives for the citizenry to embrace e-government

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<sup>35</sup>[http://europa.eu/rapid/press-release\\_IP-13-608\\_en.htm](http://europa.eu/rapid/press-release_IP-13-608_en.htm)

offerings. The resultant DAE benefits would be maximized if this initiative was followed by the early adoption of e-invoicing as the default position.

3.45. In May 2013, two OPAC projects became operational, thus completing the integration of another 30 registers into the single information system and enabling the provision of another 200 services by electronic means. Some of the project activities will also support the process of setting up electronic municipal government (e-municipalities), which are intended to integrate local administrations into the overall project for the introduction of e-government in Bulgaria (Measure CSR5–D2).”

3.46. These services are used by businesses, but only a small fraction of citizens use them. As the EU Council observed in its recommendations of 19th June 2013 “The competitiveness of domestic companies and the attraction of foreign investments would benefit greatly from improvements to Bulgaria’s business environment, including increased efficiency of public services. A speedier, systematic introduction of e-government offers considerable potential and could, inter alia, reduce compliance costs and the administrative burden for business.”

3.47. Considerable support is available to the Bulgarian authorities from other member states in further elaborating and implementing its e-government vision. A vision will entail elements regarding the process by which services are progressively adopted for e-delivery and elements regarding the platform and technical aspects of services. It is highly recommended that a partnership is sought with an experienced e-government region or the EU member state.

3.48. For example, the Flemish regional government (Box 1) assisted the Polish authorities. In particular, the Flemish team helped its counterparts to map the overarching objective, building efficient government service delivery systems for citizens and business with minimal impact to existing operations, to a specific action plan geared at identifying the ‘maturity level’ of each government service considered. Clearly, the Flemish and Estonian authorities know how to provide incentives to their citizens to become e-government believers. This type of knowledge is transferable. Arrangements similar to those between the Polish and Flemish and Estonian and UK governments are available to the government of Bulgaria.

#### Box 1: The Flemish and Estonian e-Government models

The Flemish E-government Co-ordination Unit (CORVE<sup>36</sup>) provides a model for e-government implementation. It has implemented a Flemish Integration Platform (VIP) supporting a large range of e-government services<sup>37</sup>. The objectives of VIP are to:

- Realize applications which make life easier for companies and citizens, by a) setting up fully electronic processes through which a whole administrative procedure can be completed and b) maximizing the number of authentic data sources used. As a result, citizens and companies do not have to submit data which the government already has at its disposal.
- Support the regional government in the development of advanced e-government projects which

<sup>36</sup><http://www.corve.be/english/tasks.php>

<sup>37</sup><http://www.corve.be/english/examples.php>

collect data only once and make optimal reuse of information.

Each year in February, CORVE launches a call for innovative and customer-oriented projects. The submitted projects are evaluated by a jury in terms of their social benefit and their technical feasibility. The jury is composed of specialists in the areas of e-government, administrative simplification and public service provision. The most important criteria judged by the jury is whether the project directly benefits (with visible results) citizens and businesses.

CORVE has developed a business case model to facilitate project evaluation. Together with the call for projects, a project office is set up to provide support in the drafting of the business case. During the period of the call, a workshop is also organized which all interested parties can turn to in case they have any questions. During the workshop a number of VIP project implementations are also demonstrated. Once a project has been selected CORVE organizes a tender for the materialization of the project. CORVE does not produce the software in-house. Between 2005 and 2008, CORVE implemented 45 VIP projects on a budget of €3 million. In 2009 CORVE received an EU “Good Practice” award.

Estonia is a world leader in e-government and in February 2013 the UK government signed a Memorandum of Understanding<sup>38</sup>(MoU) to work together with the Estonian government on digital government and public services where such services would digital by default. As a result of the MoU the two governments will together engage in:

- promoting contact and exchange of public officials and experts and organizing joint events
- sharing knowledge and capability in design, architecture and security of public information systems and initiating joint (pilot) projects in this realm
- collaborating to ensure that both participants will have effective capability and development streams when developing digital public services

In a similar manner, preparations are underway for a MoU between the Estonian and Portuguese Information Agencies.

Source: EC Smart Specialization Platform. <http://s3platform.jrc.ec.europa.eu>.

3.49. The EC has also been particularly active in supporting the development and implementation of e-government services. For example, the Large Scale Pilots<sup>39</sup> initiative can provide off the shelf support on e-procurement, while the Horizon 2020 and Connecting Europe Facility will similarly support the switch over to digital services.

3.50. The EC also provides solid hands on support. For instance, the “eProcurement Forum at ePractice.eu” is an initiative sponsored by the EC to help all the practitioners in public electronic procurement<sup>40</sup> in Europe to meet and share their experiences and knowledge, to ask and provide support. The e-procurement Forum is an open space for professionals to debate and exchange knowledge on public electronic procurement, from tendering to invoicing. In May 2012 the Forum published “The e-procurement map” which lists and explains the output and workings of the e-procurement community (including the EC and European Institutions).

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<sup>38</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/128730/MoU\\_UK\\_Estonia\\_digital.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/128730/MoU_UK_Estonia_digital.pdf)

<sup>39</sup> See <http://ec.europa.eu/digital-agenda/en/digital-public-services-cross-border-pilots-lsps>

<sup>40</sup> <http://www.epractice.eu/en/community/eprocurement>

3.51. By these means, it is possible that Bulgaria can leap to an off-the-shelf state-of-the-art solution, unencumbered by legacy services and platforms. The key is to work very closely with EU partners and make effective use of EU funding and to accept the switch over as an imperative.

3.52. These two priorities will provide the momentum for an acceleration of the transformation process and a strengthening of the Smart Specialization Strategy. However, government action should not be limited to these priorities. For example, action is required regarding access to computers in schools (see Chart D in Annex 1). There are numerous ways in which it can act to address issues of broadly defined ICT literacy within established EU programs such as the Innovation Union facility. Clearly, a first step is to audit the opportunities available and then to seek technical support, where needed, to take advantage of such opportunities.

## Chapter 4: ICT Policy to strengthen Digital growth and S3 in Bulgaria

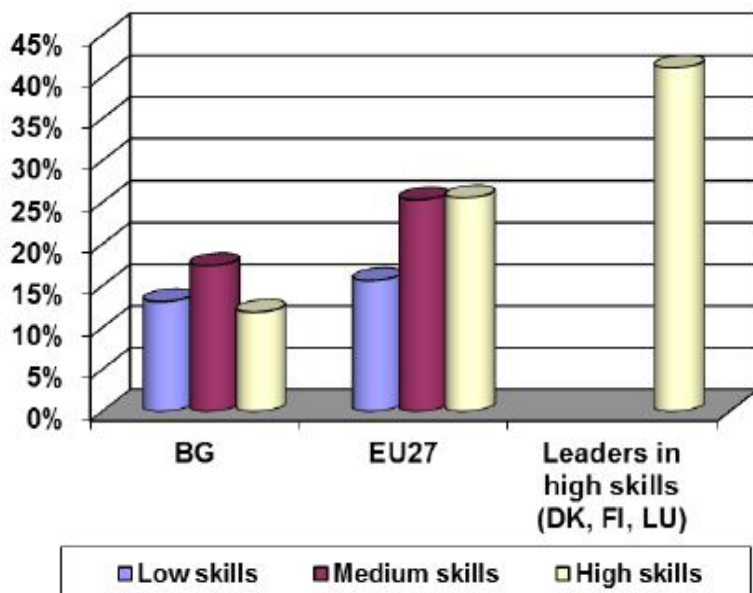
4.1. ICT and broadband are key tools for the success of the smart specialisation strategy – in fact this is woven throughout the report. There are two additional matters that could be addressed with regard to possible 3S pipeline of activities:

- What would be the consequences of a significant concentration of ICT professionals working in Bulgaria for off-shore enterprises?
- What are the additional activities (especially with high growth rates) where Bulgaria holds a near unique position and which could beneficially be an area for smart specialisation using ICT?

### A. ICT skills for strengthening competitiveness of clusters

4.2. E-commerce in Bulgaria is not fully developed, with only a small fraction of even large enterprises trading on-line. Figure 3 illustrated the link between frequency of internet usage and the relevant skill levels. Figures 23 and 24 demonstrate the lower than EU average internet and computer skills, as well as the relatively low level of ICT professionals employed in the Bulgarian economy.

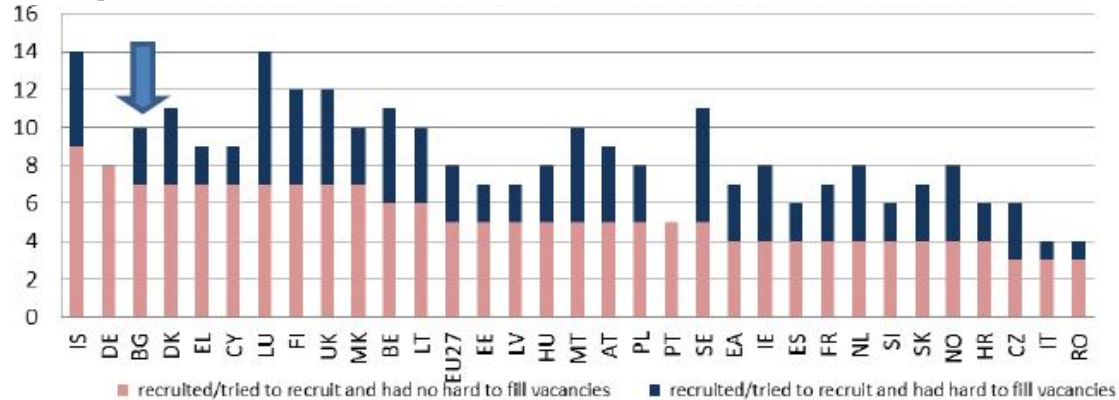
Figure 23: Computer skills, 2012



Source: European Commission.

4.3. Figure 23 compares Bulgaria with EU average and ‘best-in-class’, the target for computer skills, where the leaders have 4 times as many high skill employees as Bulgaria. In 2012 in Bulgaria, 10% of enterprises (above the EU average) recruited or tried to recruit ICT specialists. Of these 34% (or 3% of all firms) experienced some difficulty in recruiting which is below the EU average. This is illustrated in Figure 24.

Figure 24: Enterprises that recruited ICT specialists, with and without difficulties in filling vacancies (% of enterprises), 2012



Source: European Commission, as of December 2012.

4.4. Combining these indications together with observations in the main report regarding deteriorating ICT skills gives the impression that the ICT employment market in Bulgaria is not particularly ‘hot’, that skills are not being used to their full extent and that the most challenging development work is not being undertaken in Bulgaria.

4.5. If this is correct then a significant concentration of ICT professionals, in facilities like the Sofia High Tech Park, working for off-shore enterprises would bring about needed improvements. The labour market would become more buoyant, ICT jobs would become more attractive, skills would be used to their full extent, challenging work would flow in, and due to increased frequency of exposure to ICT skills would be enhanced. Since ICT and broadband are general purpose technologies there is a risk that the concentration would “crowd out” other Bulgaria activities<sup>41</sup>. However if the concentration formed the core of a cluster of ICT and broadband using knowledge-based activities the combination could provide the extra momentum for a surge in ICT skills acquisition, ICT enabled jobs and an enhanced 3S implementation.

4.6. Clusters involve bridges rather than towers, i.e. links between various activities rather than pure specialisation. In this regard, the European Union is seeking to promote clusters of large companies, SMEs, researchers, and other economic actors to help foster innovation, bring together a critical mass of commercial and R&D expertise and get maximum value from investment. It defines clusters as “a group of firms, related economic actors and institutions that are located near each other and have reached a sufficient scale to develop specialised expertise, services, resources, suppliers and skills”. Sometimes a

<sup>41</sup> Of course there is also the risk of emigration of high skilled ICT workers.

cluster is based around a purpose built facility like an IT Park which includes an incubator facility. But this is not necessarily the case. Many medieval cities demonstrate the long heritage of clusters in their street names – like Hen Lane – i.e. clusters have developed organically.

4.7. Clusters are often associated with particular activities such as the automotive sector, biotechnology, e-health, energy, ICT/optics, food/drink, space, textiles and pharmaceutical industries, but this may be a too narrow view. Clusters can incorporate all sorts of creative talent such as fashion, music, dance, performance and digital content all of which have in common their use of ICT and broadband access. The interaction between members of the cluster gives rise to innovations and this is particularly the case where products and services are based on novelty or constant creative renewal.

4.8. Clusters can provide a fertile environment in which SMEs can access research infrastructure available within universities. Small companies can also form partnerships with larger companies. This can, for example, enable a niche technology company to team up with multinational firms capable of integrating new software into existing platforms, or sell a new button to a global fashion designer. Clusters also allow research institutes to tap into the dynamism offered by small firms and start-ups.

4.9. It has long been recognised that industrial clustering benefits businesses. Clusters can be a source of agglomeration economies – the geographical proximity of firms produces collective benefits – contributing to local competitiveness and economic growth. The presence of several industrial clusters in the same place can bring other benefits too. These are referred to as ‘urbanisation economies’, which occur when ideas and knowledge ‘jump’ across industries generating unexpected, often more radical innovation outcomes. This is equally true of creative businesses (see below), as exemplified by Hollywood, or a host of thriving cultural and creative European clusters.

4.10. It is a matter of policy decision whether to rely on organic development of clusters or to pursue initiatives to support the development of clusters. Clearly, if an initiative to establish a concentration of ICT skills is underway, such as the Sofia Tech Park, the prospects of basing a cluster on this concentration should be considered in 2013 within the context of the revision of the National Strategy for Broadband Development or the National ICT framework. This consideration can be undertaken in the near term as an element of pipeline activities.

## **B. Uniquely Bulgarian: Implementing the Digital Agenda in the CCI, Tourism and Software industries**

4.11. Bulgaria has an absolute advantage in areas which are uniquely Bulgarian. The 3S challenge is to apply ICT and broadband to these activities and commercialise them successfully. Bulgaria has a unique advantage in the history, language and culture, as well as its unique tourism offering which can include history and culture. The following outlines potential innovative pipeline activities for implementation in the medium term regarding the creative and cultural industries, tourism and the ICT sector. These are three sectors, where growth rates are high, and where Bulgaria is able to differentiate itself from other markets.



### *ICT in Cultural and Creative Industries*

4.12. At one level there is a sizeable Bulgarian *Diaspora* market which could be addressed by the 3S. But at a more significant level this uniqueness is strongly associated with creative activities and industries. The cultural and creative industries (CCI) in the EU are comprised of a large number of micro and SMEs with a very small number of large enterprises. Generally, CCI experience much faster growth rates than average, are knowledge intensive and are highly innovative. Further CCI tend to form clusters where there are substantial positive spillover outcomes. The CCI include advertising; architecture; arts, antiques and craft; designer fashion; video, film and photography; music and the visual and performing arts; publishing; software, computer games and electronic publishing; radio and TV.

4.13. Eurostat data demonstrates that in 2009, at EU-27 level, 3.6 million people were employed in five main cultural sectors of economic activity representing 1.7 % of total employment. Moreover, the percentage of persons employed with tertiary education was much higher in the cultural sectors than in total employment. The difference between the two averaged 24 percentage points at the EU level. In 2009, the European Union counted about 270 thousands archivists, librarians and related information professions and 1.48 million writers and artists. The first group accounted for 0.1 % of total employment and the second for 0.7 %.

4.14. Using the broader definition of the CCI, the European Commission observed that they “are a powerful motor for jobs, growth, export earnings, cultural diversity and social inclusion, representing 4.5% of total European GDP in 2008 and accounting for some 3.8% of the workforce. They therefore have a vital contribution to make to the Europe 2020 Strategy for smart, sustainable and inclusive growth.”

4.15. It is estimated that in 2003 the CCI turnover in Bulgaria was €884 million and that between 1999 and 2003 average turnover growth rate was 13.8%. In 2003 CCI contribution in Bulgaria to GVA was 1.2%, compared to 0.3% for computers and related activities, 0.4% from real estate, 0.4% from the manufacture of rubber and plastics and 1.1% from the manufacture of chemicals, chemical products and manmade fibre. Eurostat reports that for the period 2002 to 2007 turnover of enterprises in the Bulgarian cultural sector were the fastest growing in the EU with a growth rate of 20% about 10 times the EU average while in 2009 cultural sector employment as a percentage of all employment was 1.7% in France (the same as the EU average) with Bulgaria just behind with 1.5%.

4.16. In these circumstances, it is not surprising that the EC’s ICT Policy Support Programme (PSP) 2012 included the following aims:

- Promote access to Europe's cultural resources
- Promote creative use of cultural content
- Increase collaboration among creative industries

4.17. The evidence shows that creative firms tend to locate close to each other even more than most other sectors and such clusters tend to involve innovation leaders which produce intellectual assets. With the application of ICT it is possible to establish virtual creative clusters and thereby achieve economies of agglomeration and urbanisation.

### *ICT in Tourism Industry*

4.18. Tourism is an information intensive sector and therefore benefits significantly from ICT. The distribution of tourism information and products over broadband is the main area where technological innovation has had the most profound impact on tourism enterprises (producers and distributors). The diffusion of ICT enables tourism businesses to make tourism products and services directly available to a large number of consumers at a relatively low cost, and to interact with them, as well as with other tourism producers and distributors.

4.19. The increasing number of consumers that use the Internet to plan leisure or business trips represents a major incentive for countries to organize and develop their tourism offer and its promotion over broadband networks. Furthermore, by removing a layer of intermediation a higher proportion of revenues is retained by the provider. ICT are a key driver for countries in organising and marketing their tourism offer in order to gain more autonomy in their search for business. The diffusion of ICTs in the tourism industry enables tourism enterprises to enter tourism markets and interact directly with consumers and foreign tourism distributors, leading to a process of disintermediation.

4.20. According to the 2009 Eurobarometer survey, cultural attractiveness is the second motivation for Europeans (after the value for money) when deciding on a holiday destination or accommodation. In this context Bulgaria is well placed having a sizeable number of UNESCO heritage sites. However, Bulgaria's cultural attractions are not well known. In fact tourism in Bulgaria would benefit significantly from the application of ICT and access to broadband. Between December 2012 and March 2013 there were over 1 million foreign tourists visiting Bulgaria, an 8.2% increase over the same period 12 months previously.

4.21. The application of ICT to tourism in Bulgaria could strengthen this solid performance supporting economic diversification within the context of 3S. Tourism enterprises and related agencies can propose on-line a large variety of tourism niches based on cultural and natural resources, and ensure the visibility of local tourism providers that are not usually marketed by service providers in major markets. These platforms can also be used to tailor and promote linked activities like tourism and wine making in Bulgaria. Most countries have developed e-tourism websites using simple or more complex destination management systems (DMSs) to organize and promote their tourism resources on broadband networks.

4.22. ICT can be effective tools for Bulgaria to market its tourism offer and expand its customer base. By encouraging the development of e-business practices in the local economy (especially outside Sofia) ICT make it easier to organize the tourism industry and stimulate cooperation among stakeholders. Tourism enterprises with well-conceived websites are given an opportunity to access international tourism markets on an equal footing with competitor destinations. The use of ICTs for tourism development can produce economic benefits by generating increased revenue for the local economy and contributing to local development.

4.23. Frequently the off-line and on-line marketing and distribution of tourism in countries like Bulgaria is carried out by service providers based in major markets. It does not therefore necessarily reflect the interests, the tourism wealth, or policies of the destination countries. ICTs represent one of the most effective tools for remedying the imbalance by allowing countries to take charge of their own tourism promotion, generate more revenue for the local economy, and remain competitive by promoting new and complementary tourism offers online. Understanding the opportunities brought about by ICTs in the tourism industry and implementing effective e-business solutions has become a priority for public authorities and tourism providers at national, regional and community levels in many countries and are of particular relevance to 3S.

4.24. In many countries destination management organizations (DMOs) have developed an online presence. It is not clear whether in Bulgaria the DMO offers a state of the art web portal in the form of a DMS that would propose effective booking and transaction facilities<sup>42</sup>. In order to take full advantage of ICTs and improve its competitiveness in tourism markets, Bulgaria has to instil e-business practices effectively among all stakeholders and integrate local tourism providers into DMSs. In the age of travellers and broadband this necessity only strengthens the case for government leadership in promoting e-commerce through e-procurement.

4.25. Tourism involves many different actors from the public and private sectors. The involvement of the Bulgarian public sector is necessary in terms of tourism planning and policy. E-tourism strategies will be most effective when they are integrated within the broader framework of national Bulgarian ICT policy addressing ICT access, capacity building, the adaptation of the legal and regulatory framework, and trust-building issues related to online transactions. Further the government should identify tourism niches that are most likely to increase the attractiveness and competitiveness of Bulgaria. Eco-tourism, cultural and natural heritage tourism, health and medical tourism and adventure tourism are some of the tourism niches could be marketed.

4.26. The prospect of ICT applied to tourism strengthens the requirement for broadband roll out in rural areas and much wider participation in e-commerce. Further there is a strong association between tourism, the CCI, clusters ICT, broadband and 3S. It also requires a high level of government leadership to coordinate and empower the Destination Management Organisations.

### *ICT and Software Industry*

4.27. The ICT sector in Bulgaria has shown consistently excellent performance in several aspects, and has strong potential for innovation and export-oriented growth. There has been constant growth from 2006 to 2010 in terms of revenue (14 %) and profits (83%); and constant growth of export of ICT goods and services (14 times) since 2005, reaching 2 billion in 2011 (47% of the total export of business services).<sup>43</sup>The average value created per employee was BGN45,700 in 2010, which is three times higher than the national all industries average (BGN16,800 per capita). The ICT sector also has the greatest

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<sup>42</sup>See [http://bulgariatravel.org/en/official\\_tourism\\_portal](http://bulgariatravel.org/en/official_tourism_portal)

<sup>43</sup>Broadband Quality Score 2009 (BQS); Invest Bulgaria Factsheets, InvestBulgaria Agency, 2011.

number of registered patents (90 percent of all Bulgarian patents for the period of 2001-2010); and the greatest number of R&D projects under the Seventh Framework Programme (FP7).<sup>44</sup>

4.28. However, Bulgaria's ICT sector is still far behind that of other EU countries, including Hungary and Slovakia. It accounts for only about 5 percent of GDP, and does not attract the level of FDI as Romania and the Czech Republic. For ICT to become a leading driver of growth, a substantial change in policies and targeted support for the sector are necessary. Currently the industry is equally separated between the three key sub-segments in terms of employment, but telecommunications contribute 73 percent of the revenues. The remaining two key sub-segments - computer programming, consultancy and information service activities, represent respectively 14percent and 6percent of the sector revenue.

4.29. The key challenges of the sector are:

- *Lack of focused Government support.* The sector is not supported by the proper instruments, clear and fair rules for doing business, or efforts to reduce the administrative burden. There is also a lack of public financing for R&D, technology transfer support, and support for the commercialization of innovative ideas. Instability, corruption, crime, and informality are ranked among the top constrains for IT experts according to the World Bank Survey of Administrative and Regulatory Costs in Bulgaria (2010).<sup>45</sup>
- *The greatest barrier to further sector development is the human capital shortage.* Bulgaria ranks last in Europe in preparedness of its human capital for living and working in the Knowledge Economy (INSEAD e-lab 2010).<sup>46</sup>The sector lacks experts, and despite the large number of students with an ICT diploma (around 3,000 per year), the quality of ICT education is deteriorating in most universities. As a result, the cost of expert advice has persistently gone up.<sup>47</sup>Apart from the increased number of experts needed, the requirements for their competences are changing from technical knowledge and skills to key social skills and an attitude of innovation.
- *Payments to experts working on international assignments (for example, under FP7 programs) are significantly lower (up to 10 times lower) than in Western Europe, as they are calculated based on the local average salary.*

4.30. The sector consists of companies of different sizes and specializations. Large companies account for one-third of employment. Sofia is the undisputed hub of the ICT sector, with more than 85 percent of employees. Other regions that specialize in ICT are Plovdiv, Ruse, Varna, and Bourgas.

4.31. The ICT sector arguably has the highest innovation potential of all sectors of the Bulgarian economy, in both business process innovation and innovative products and services. Companies operating in this sector are part of the small group of global innovation leaders and successfully export products and services in the highest value-added segments global ICT market. Software, Hardware,

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<sup>44</sup>World Bank (2012). Going for Smart Growth: Making Research and Innovation Work for Bulgaria. Report No.66263. World Bank: Washington DC.

<sup>45</sup>World Bank (2010). *Bulgaria: Administrative and Regulatory Barriers to Business*. Report No. 55727-BG, July 2010.

<sup>46</sup>“Who cares? Who dares?” report, INSEAD eLab team, led by Bruno Lanvin and Nils Fonstad, 2010

<sup>47</sup> Average salaries in the sector are significantly higher than in other industries.

Telecommunication and IT services together account for almost 70 percent of Bulgaria's international patents, and the number of patents has increased significantly since 2004. In 2012, 18 of the 23 patents issued were related to ICT. Data processing, digital processing, software development, digital communication, and electrical computers have the highest total number of patents. Apart from excellent potential for sector growth, ICT has the potential to drive the innovation-based growth of the Bulgarian economy as a whole.

4.32. Bulgaria is recognized as a good destination for outsourcing and offshoring. Key ICT players are already successfully operating in Bulgaria shared (or managed) services centres.<sup>48</sup> This created significant opportunities for human capital formation and building much need combination of technical and business skills capacities. Harnessing the knowledge, skills and business networks of Bulgarian ICT experts living abroad would help generate additional opportunities for sector development in higher value added segments, generate FDI and address some concern associated with the shortage of skilled workforce.

### **C. Developing the Action Programme for Bulgaria's Digital Growth**

4.33. The findings from the benchmarking of Bulgaria's ICT ecosystem and the review of institutional framework underline the urgent need to integrate the following strategic objectives and recommendations to provide the basis for an Action Programme and be the focus of regular monitoring and evaluation afterwards to:

1. On organisation, establish a single leading organising body within government to implement specific tasks, co-ordinate all other tasks and take responsibility for the Digital Growth Action Plan for Bulgaria as outlined below
2. On the supply-side increase penetration of the broadband across Bulgaria and to expand the access in rural areas
3. On the demand-side establish capacities for the E-Government through e-Procurement and e-Invoicing order to drive growth in e-commerce
4. In support of supply and demand advance digital literacy (e-Skills) development
5. Pulling it all together strengthen the competitiveness of clusters through the ICT.

4.34. Successful implementation of actions in these areas would support smart specialisation, providing positive results for the innovation process and the general competitiveness of the Bulgarian economy. They would strengthen the efforts to meet the DAE targets, thereby harnessing digital growth opportunities in order to meet the objectives of Europe 2020.

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<sup>48</sup> Bulgaria has been ranked 9th in A.T. Kearney's annual ranking for 2009 of the most attractive locations for off-shoring of service activities such as IT, business processes and call centers. Bulgaria also placed 13th in the Economist Intelligence Unit's global ranking of best outsourcing destinations for 2010

***Recommendation No.1: Organise - Strengthen the institutional coordination and governance of ICT***

4.35. The recommended Digital Action Plan for Bulgaria (its Digital Agenda) is aligned fully with the 2020 vision of the country for smart, inclusive and sustainable growth and has a central role to play in fulfilling this vision. This action plan is centered on activities that are to be undertaken by government across a broad range of locations and initiatives. In order for the action plan to achieve maximum impact a single organizing body within government must implement specific tasks, co-ordinate and take responsibility for the Digital Growth Action Plan. Clearly such an organising body (OB) must be empowered appropriately to carry its duties. The establishment of the OB is a matter of extreme urgency. The OB should then quickly conclude ‘who does what’ and timetable with all other governmental bodies which will form the basis of the implementation plan for the action plan.

4.36. The European Commission has updated detailed guidelines for State aids issues relating to the public finance of broadband. A great deal of research has been undertaken and published by the European institutions. Key questions have been formulated and investment models have been elaborated. All of these resources are available to the Bulgarian authorities and its agencies. The low levels of take up in general and the absence of coverage in rural areas also limits the impact of the work undertaken by the authorities on “Open Government”.

4.37. It is strongly recommended that the National Strategy for the Development of Broadband is given a highest near term priority and, if necessary, is revised so that it can gain approval for State aids purpose of the entire development plan which is much more efficient than a case by case approach. This will involve applying the principles and best practices to a set of questions set out by the EC. The revised Plan can then be used as the basis for financial support from EU financial instruments for investment in broadband in un-served rural areas – the rural broadband project.

4.38. It is possible to conclude that the first priority to be completed in 2013 is to ensure the national framework for broadband gains State aid approval and which can then form the basis of applications for EU funding recognising that the authorities may require some technical support for this action. Once the framework has received relevant State aid clearance there is no need for any additional approval of individual projects. This matter should be the priority of the OB.

4.39. It is recommended to improve insufficient coordination of civil works, by enabling any network operator to negotiate agreements with other infrastructure providers.

***Recommendation No.2: Supply - Increase penetration of the broadband across Bulgaria and to expand the access in rural areas***

4.40. It is recommended that investment in rural broadband infrastructure where there is a market failure is given the highest priority noting the potential stimulus such investments can provide to the wider economy. Such investments could utilise public finances to leverage additional private sector funding and could both benefit from the experiences in other member states and draw on existing business models. This matter should be the priority of the OB.

4.41. While the government is securing public finances to support investment in broadband infrastructure in rural areas, operators and other potential entrants must seek to add to these funds and prepare to roll out infrastructure according to the investment model(s) chosen by government for this purpose. In addressing these matters the private sector has and will play the leading role, e.g. Blizoo recently invested €25 million in its fibre network, and offers among Europe's fastest data rates. Equally the association of cable communications operators (BACCO) continues to guide infrastructure expansion and ensure access to Vivacom's passive network while liaising with municipalities and broadcasters.

4.42. Operators have made considerable investments in coverage. It is in the self-interest of network operators to attract paying customers to their broadband networks. Operators must invest in marketing services to increase penetration. Operators must find ways of addressing the more than 40% of citizens that have never used the internet. They have to convince households that the (PPP) €21 per month is worthwhile. Equally the operators need to find ways for SMEs to use broadband to access to platforms to reach global markets. Increase penetration is the single most important recommendation. Operators and owners of relevant infrastructure assets must work with government as it seeks to map the broadband landscape while revising the National Strategy for the Development of Broadband.

4.43. It is recommended that the 3 regulations proposed in the draft "Proposal for a Regulation of the European Parliament and of the Council on measures to reduce the cost of deploying high-speed electronic communications networks" of 26<sup>th</sup> March 2013 which are not already in place in Bulgaria be transposed at the earliest date. In initiating these actions Bulgaria would assume a leadership role among MS as well as encourage investment in broadband infrastructure (it should be noted that MTITC has a particular role to play in regards to bullet 2 below):

- Ensuring that new or renovated buildings are ready for a high-speed broadband
- Opening access to infrastructure on fair and reasonable terms and conditions, including price, to existing ducts, conduits, manholes, cabinets, poles, masts, antennae installations, towers and other supporting constructions.

4.44. It is strongly recommended that the mapping exercise of existing broadband infrastructure is completed in 2013. It is strongly recommended that a meaningful schedule is established in 2013 for the rural broadband project based on the supplied project flow chart.

***Recommendation No.3: Demand - Establish capacities for the E-Government through e-Procurement and e-Invoicing***

4.45. It is recommended that in the near term there is a full switch over by government to e-procurement and e-invoicing as the default position. This matter should be the priority of the OB. The timing of the full implementation of the switch over should be linked the roll out of broadband in unserved areas. It is also recommended that the Government assumes an EU leadership role by moving early on e-invoicing for public procurement (based on the recent draft directive). These actions, where procurement is over €2.3 billion, will provide significant momentum for the development of e-commerce and digital growth. Consequently the entire supply sector must be prepared to earn a sizeable proportion

of revenues from e-commerce, and therefore, it must seek to enhance its e-skills and e-competences such those flowing from the Future Internet initiatives, Entrepreneurship 2020 Action Plan including the Start-up Europe Partnership, the EU Accelerators Network and the EU Crowd-funding Network, as well as the forthcoming ICT Innovation Vouchers targeted at SMEs.

4.46. Purchases by central and local governments and agencies account for a substantial proportion of GDP. Collectively they are the single biggest buyer in the Bulgarian economy. One course of action would be to fix a date in the medium term for the full switch over by government to e-procurement and e-invoicing. More than 80% of Bulgarian businesses already interact on-line with government. These businesses already have the necessary hardware and are connected. But only a very small fraction of businesses trade on-line. A switch over to e-procurement and e-invoicing for public procurement would provide a massive stimulus to e-commerce in Bulgaria by requiring that all suppliers to government trade electronically. It would also be a significant stimulant to the payments and delivery sectors. However in order not to prejudice businesses in rural areas it would be necessary to complete the roll out of broadband in those un-served rural areas.

4.47. One of EC recommendations included the following “Take further steps to improve the business environment, by cutting red tape, implementing an e-government strategy and implementing the legislation on late payments.” While another included the following “Accelerate the absorption of EU funds. Ensure sound implementation of public-procurement legislation by extending ex-ante control by the Public Procurement Agency to prevent irregularities.” Furthermore, the EC estimates suggest that further procedural streamlining in SPC could contribute growth of up to 0.2-0.3 % of GDP in the medium to long term.

4.48. The legal and regulatory framework is in place and a wide range of services are available. The platforms and apps are running, the e-procurement portal is open for business. Consequently, an active well designed phased programme for promoting e-government, in particular a full switch over to e-procurement and then e-invoicing, is the single most effective means of stimulating demand for broadband utilisation, ICT diffusion, ICT literacy and digital growth. The costs of the full switch over by government to e-procurement and e-invoicing are trivial in comparison to the costs to the economy of not switching over and maintaining the e-commerce status quo. Such a course of action would:

- Involve substantial skills acquisition by all parties - including suppliers
- Include a significant campaign explaining in detail the switch over objectives and schedule
- Require a high degree of government coordination
- Involve assigning a very high government priority to the project
- Require a dedicated multi-skilled co-ordinating team to ensure effective implementation
- Positive response from the supply sector



4.49. In the short term policy for e-government, in order to fulfil the recommendation regarding the full switch over to e-procurement, the early adoption of e-invoicing and to generally encourage the take up of e-government services it is recommended that the Bulgaria authorities seek a partnership with an experienced e-government region or MS for these purposes and in order to use the existing resources of the EC, prepare for forthcoming EU financial instruments, Note that e-government and procurement issues were included in 2 of the 7 recommendations to Bulgaria of the European Council made on 19<sup>th</sup> June 2013 in the context of the Council's opinion of the national reform programme in the context of Europe 2020.

4.50. Together with supporting actions, plus the initiatives of the private sector, these government-led measures will provide the impetus to take broadband related activities beyond a critical mass to ensure the socio-economic benefits of bandwidth are provided to all through smart sustainable and inclusive growth.

#### ***Recommendation No. 4: Supply and Demand - Advance e-Skills development***

4.51. It is recommended that the authorities in Bulgaria monitor and evaluate for applicability all programmes and financial instruments which provide opportunities for Bulgaria to advance its digital agenda, acquire e-skills and support 3S. In this respect it is important that the government takes a leading advocacy role in promoting the take up of the many opportunities to enhance e-skills and e-competences such those flowing from the Future Internet initiatives, Entrepreneurship 2020 Action Plan including the Start-up Europe Partnership, the EU Accelerators Network and the EU Crowd-funding Network as well as the forthcoming ICT Innovation Vouchers targeted at SMEs.

4.52. It could also require some EU funding of “off the shelf” e-procurement skills for SMEs. Further, such a course of action would benefit from the authorities in Bulgaria working in partnership with peers in other MS or regions. For the future, the acquisition of e-skills should be a major component of the “Employment for Youth” initiative.

4.53. In terms of near term pipeline activities a significant concentration of ICT professionals, in facilities like the Sofia High Tech Park, working for off-shore enterprises may energise the ICT labour market. This momentum would be enhanced if the concentration of ICT skills formed the core of a cluster of ICT and broadband enabled businesses. Clusters involve bridges rather than towers, i.e. links between various activities rather than pure specialisation. It is recommended that the prospects of encouraging clusters on planned concentrations of ICT skills should be considered within the National ICT framework or the revised National Strategy for the Development of Broadband. This consideration can be undertaken in the near term as an element of pipe line activities.

#### ***Recommendation No. 5: Pulling together - Strengthen the competitiveness of clusters through the ICT***

4.54. All of the characteristics of the cultural and creative industries (CCI) indicate that they are relevant to the 3S as it evolves and in particular with any innovative initiatives regarding the development of clusters. It is recommended that the CCI clusters should be considered in 2013 in the context of the revision of the National Strategy for Broadband Development or the National ICT framework. An early announcement of this intention will prepare the private sector for new supportive investments. It is also

recommended that as soon as possible the authorities enter consultations with all interested parties to develop the forms CCI clusters might take and what additional actions by the private and public sectors may be required to maximise digital growth.

4.55. It is recommended that ICT and tourism, particularly the implications of acquiring a state of the art Destination Management System run by the Destination Management Organisation, should be considered in 2013 in the context of the revision of the National Strategy for Broadband Development or the National ICT framework. An early announcement of this intention will prepare the private sector for new supportive investments. It is also recommended that as soon as possible the authorities enter consultations with all interested parties to develop the expected impact of such an initiative and what additional actions by the private and public sectors may be required to maximise digital growth. In many countries destination management organisations have developed an online presence. It is not clear whether in Bulgaria the relevant organisation offers a state of the art web portal in the form of a destination management system that would propose effective booking and transaction facilities. This is a pipeline activity candidate.

4.56. In order to take full advantage of digitization to improve competitiveness and stimulate growth across the CCI, tourism and ICT markets, Bulgaria has to instil e-business practices effectively among all stakeholders and integrate local businesses and actors with platforms and applications. This necessity only strengthens the case for government leadership and coordination in promoting e-commerce through e-procurement and rolling out broadband in rural areas. In these instances forthcoming ICT Innovation Vouchers targeted at SMEs could be flexible and useful instruments.

## Conclusions

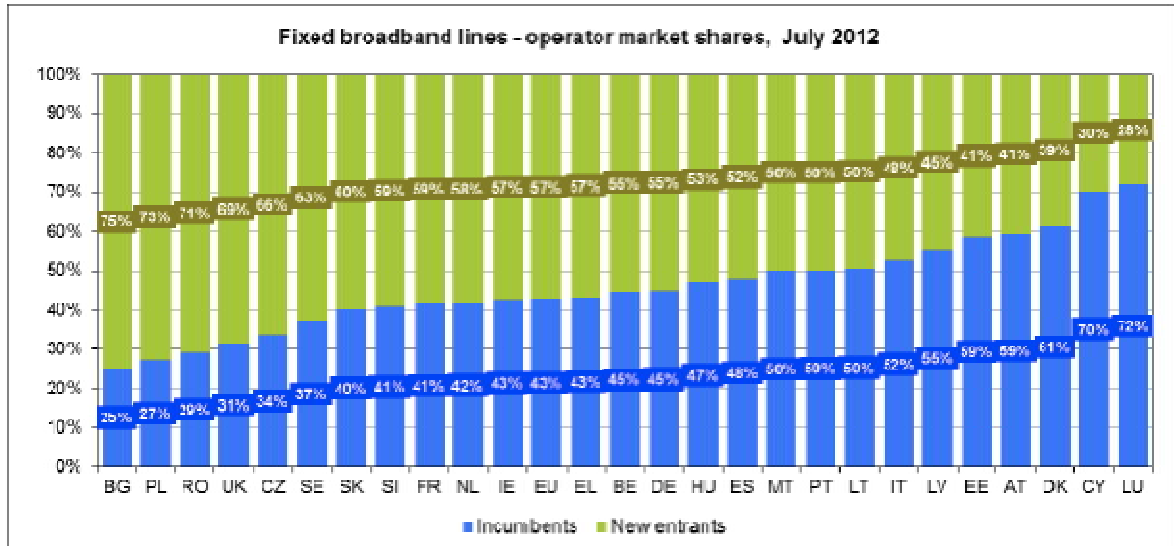
The rapid spread of broadband usage is stimulating new opportunities, new ways of doing old activities and introducing new paradigms. The innovation system is becoming much more open with considerable opportunities for content, applications and platforms providers. The Europe 2020 Strategy seeks to harness these developments to bring about smart sustainable and inclusive growth. The DAE and the Innovation Union initiatives are welded to these objectives.

The achievement in Bulgaria of the targets set by the DAE would have a powerful positive impact on the success of the Smart Specialisation Strategy and its contribution to growth in the Bulgarian economy in a virtuous circle. There are highlights in the performance of Bulgaria in the DAE Scoreboard where Bulgaria scores above EU-27 averages. But the highlights are outweighed by results that are below average. There are serious risks that Bulgaria will fail to achieve its full potential in the new paradigm and not attain sufficient smart sustainable inclusive growth. At the same time there are considerable opportunities for Bulgaria since starting from a lower base it is not encumbered by legacy assets, platforms and modalities. Bulgaria can jump to best practice. But the jump requires urgent and coherent action.

The discussed priorities and recommendations for Bulgaria will provide the momentum for an acceleration of the transformation process and a strengthening of the Smart Specialisation Strategy to deliver smart, sustainable and inclusive growth. Yet, government action neednot to be limited to these priorities.

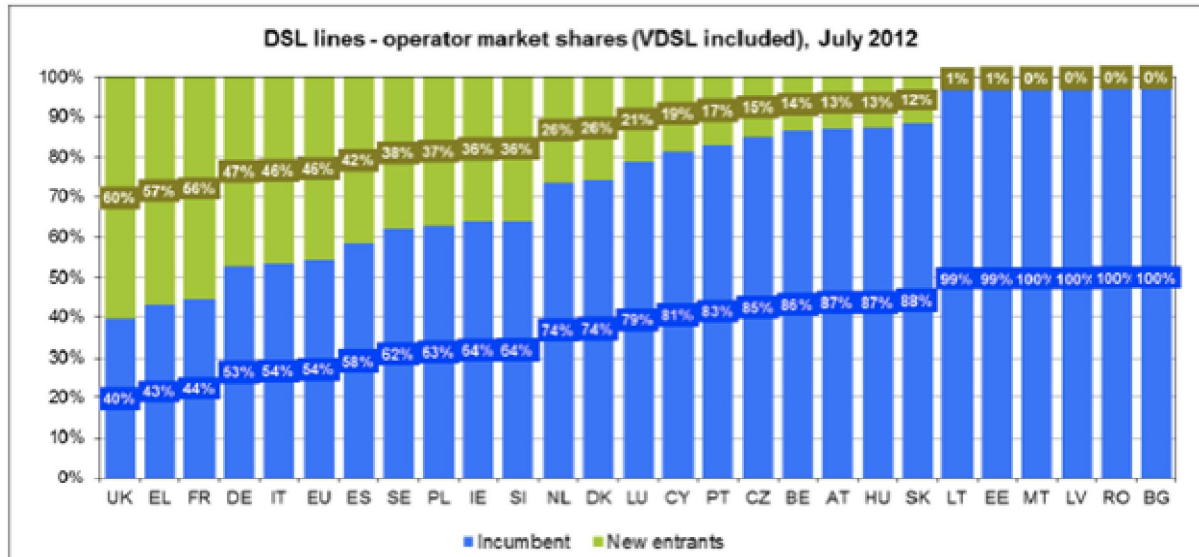
## Annex 1: Broadband and Access to Internet

Chart A. Operator share of fixed broadband lines



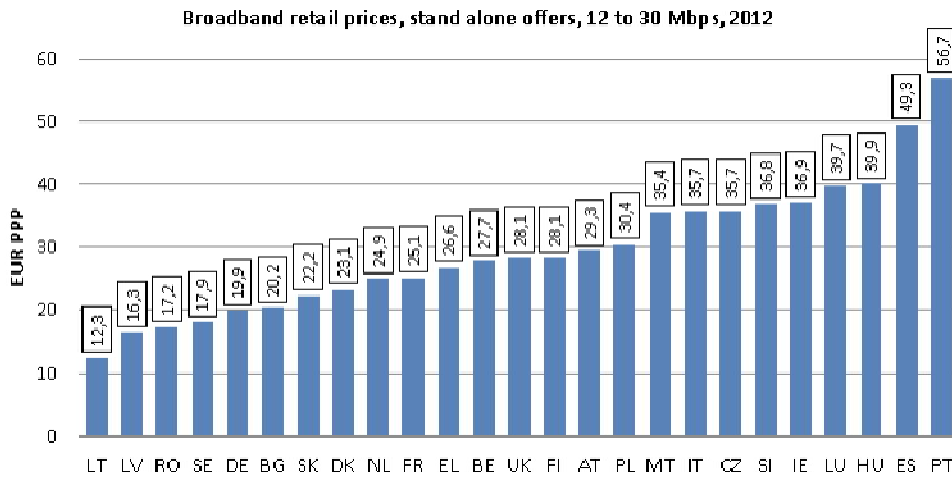
Source: European Commission

Chart B. Operator share of DSL



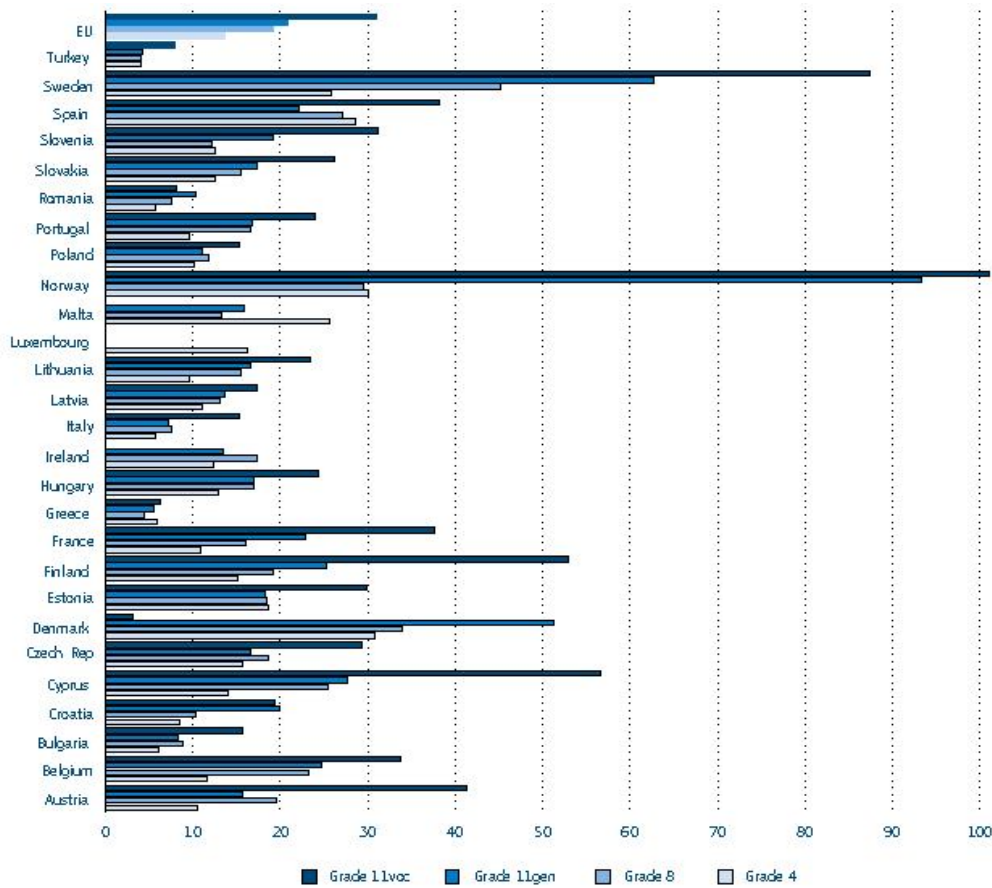
Source: European Commission

Chart C. Broadband Retail Prices, 2012



Source: European Commission

Chart D. Computers in Schools per 100 students by different Grades



Source: Survey of Schools: ICT in Education

Source: Eurostat Survey of Schools ICT in Education

## Annex 2: Best practice in State aid measures<sup>49</sup>

Regardless of the type of public intervention devised, all aid measures have to comply with the general compatibility criteria set out in paragraph 51 of the Broadband Guidelines and, where applicable, with the specific compatibility criteria set out for NGA networks (in particular paragraph 79). Drawing on the Commission's experience, the following sections provide a best practice primer on how these criteria can be fulfilled.

### *General compatibility criteria*

**Detailed mapping and coverage analysis:** Detailed mapping of currently available broadband infrastructures is the first and fundamental step needed to identify areas affected by market failure and thus to verify whether and where State aid is actually justified. This verification should be carried out in two steps: first, the public authorities should carry out a market analysis to identify existing broadband networks and services in the targeted areas, so as to identify areas lacking adequate broadband infrastructure. The choice of minimum territorial unit is left to the discretion of the granting authority. Mapping can be done per postcode, per municipality, per local exchange area, etc. Second, the results of the market analysis, including the identified targeted areas as well as the subject of the measure (NGA/basic broadband/backhaul network/etc.) should be open for public consultation. Best practice in public consultations includes publication of the details of the measure on a prominent webpage to which adequate publicity is given, and enough time for stakeholders to submit their comments. If an operator raises concerns on the planned State aid measure during this process (e.g. due to existing investment plans), the granting authority should analyse the concerns in detail. Aid can only be granted if, as a result of such market analysis and consultation with stakeholders, it is concluded that there is no comparable broadband offer provided or expected to be provided by the market in the targeted area in the next three years. To further increase transparency, after an operator is selected through an open tender procedure, the granting authorities should publish information on the winning bid, the selected operator, the exact areas to be covered, the timeframe for investment to take place, the proposed technological solution(s), the aid amounts and/or aid intensity of the measure.

**Open tender process:** The Guidelines refer to the principles of the public procurement Directives to ensure that (1) no technology platform or (2) operator is favoured when granting aid, (3) the most appropriate (technological, financial, etc.) solution comes up as a result of market forces and (4) the aid amount is reduced to the minimum necessary ("gap funding"). Because of the need to run an open tender process, in the broadband sector, aid amounts and aid intensities are usually only known *ex post*, i.e. after the tender process, and typically, also after

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<sup>49</sup>Source: Filomena Chirico and Norbert Gaál "State aid to broadband: primer and best practice". [http://ec.europa.eu/competition/publications/cpn/2011\\_1\\_10\\_en.pdf](http://ec.europa.eu/competition/publications/cpn/2011_1_10_en.pdf)

the Commission decision. For the purpose of assessing the compatibility of the aid, the Commission analyses the tender documents which form part of a notified measure. Therefore, public authorities should not launch a tender without a prior State aid clearance: if the Commission comes to the conclusion that certain provisions of the tender documents are not in line with the Broadband Guidelines or other relevant Commission legislation, the public authorities may have to redesign and rerun the whole tender process in line with the EC rules, a rather costly procedure.

**Most economically advantageous offer:** The selection criteria shall be objective and cannot be designed so as to exclude certain technologies. Diverse award criteria (for instance, the amount of public funding required, the amount of private investment, geographical coverage to be achieved, the pro-competitive nature of the proposed technological solution, tariffs and affordability) would offer public authorities the possibility of differentiating between proposals, based partly but not only on prices, and to select the most advantageous offer.

**Technological neutrality:** It must be left to market forces, ideally in the course of the tender process, to let the most suitable technological platform (or combination of platforms) emerge. In many cases, one single technology may not be able to provide the requested coverage or would not be economically reasonable. A mix of different technological solutions is often the best way to maximise the coverage, given the limited public funds available. However, it is important to bear in mind that in this case too, the choice of technology in each targeted area should not be predetermined by the granting authorities, but should be left to the operators to decide (again, via the competitive tender process). In certain cases, the principle of technological neutrality is also fulfilled when a specific technology seems to have been chosen *ex ante*. This is the situation regarding fibre based backhaul networks and of NGA networks. In reality, at the current stage of market and technological development, to achieve the public interest objectives of (1) offering reliable and resilient backhauling services or of (2) allowing delivery of broadband access services with enhanced characteristics (NGA), the limited availability of suitable technologies limits the choice of the public authorities to fibre infrastructures. However, this situation may change in future, especially with regard to mobile services, and in that case, all comparable technologies may need to be put on an equal footing.

**Use of existing infrastructure:** Public authorities shall encourage the use of existing infrastructure to reduce the amount of aid needed and to avoid wasteful duplication. Existing infrastructure could consist of (1) a network that is already deployed and owned by the regional government itself; (2) other available passive infrastructures, for instance existing ducts along the road or railway network (3) infrastructure of existing operators (in the form of obtaining duct access, renting dark fibre capacity from them etc.); (5) other alternative infrastructure (sewers, manholes, etc.). Public authorities can incentivise operators to provide information on their existing infrastructure and map them in a central database to support private and public investment. At the same time, this condition should not end up favouring existing incumbents

that have significant infrastructure in place, especially in cases where third parties may not have access to such infrastructure or inputs necessary to compete with an incumbent. It is for the granting authorities, together with the National Regulatory Authority, to assess whether third parties can obtain adequate access to the incumbent's infrastructure and hence are able to compete in the tender procedure on a level playing field.

**Wholesale access:** A *sine qua non* condition for granting State aid is the obligation for the aid recipient to provide open wholesale access, regardless of the presence of significant market power. In return for receiving taxpayers' money, the selected operator must give back part of the benefit thus received in the form of increased competition, as opposed to the scenario had it invested solely its own resources. Abandoning such a condition would perhaps require less aid from the granting authorities as the selected operator would be able to rely on monopolistic rents to fund the network rollout. Although in the very short term there may be a trade-off between requesting better/more access products and the need to lower investment costs (and hence State aid), in the long term, only effective competition is able to maximize consumer welfare. Allowing monopoly rents means higher costs for consumers and society in the medium/long run. State aid cannot be used as a tool to support the creation of local monopolies, and the design of the access products is one of the crucial criteria for a successful State aid scheme.

**Price benchmarking:** the pricing of wholesale access products is crucial for the success of a State aid measure: high wholesale prices would prevent market entry of third party operators and hence reduce competition, or wrongly set pricing could distort incentives for alternative operators to move up the "ladder of investment". Therefore an effective and continuously revised price benchmarking mechanism (to reflect continuous price decreases) advised by the NRAs requires close attention.

**Claw back mechanism:** Although granting authorities may experience difficulties in obtaining relevant data from the operators selected, proper monitoring of the implemented State aid scheme is essential (particularly if EU funds are also used) for the granting authorities to be able to intervene if the selected operator does not fulfil contractual obligations and to claw back public funds if overcompensation occurs. Most granting authorities use the average rate of return in the industry as a benchmark and share any extra profit above that in proportion to the original aid intensity of the measure, thus preserving the profit incentives of the subsidised operator.

#### *Specific compatibility criteria for NGA networks*

Since the potential distortion of competition could be higher, measures supporting the rollout of NGA infrastructures in areas where any basic broadband infrastructure already exists (i.e. all areas which are non-white) require additional conditions to be fulfilled.



**Access obligations:** The access obligations imposed on the chosen operator include access to both passive and active infrastructure level for at least seven years, without prejudice to any similar regulatory obligations that may be imposed by the NRA. The subsidised network has to be designed in a way that guarantees that several alternative operators have access to the subsidised infrastructure at all levels. The supported infrastructure will have to offer sufficient access to ducts, shall have sufficient dark fibre capacity, as well as access to cabinets, and active access products. In the case of NGA networks, besides the above mentioned trade off between lower investment costs and the access obligation, an additional argument may be put forward, that in low density areas, access to the passive level will not result in additional competition, since it may not be economically feasible to create an alternative network. In the absence of counterfactuals and to avoid pre-empting the outcome of market forces, the Broadband Guidelines require that as a *quid pro quo* for benefiting from public funds, the new network should be opened at as many levels as possible, thus allowing market forces to decide which access products suit them best.

### Annex 3: Components of e-Procurement

An e-procurement system manages tenders through a web site supported by a software application that includes features for supplier management and complex auctions. The following sub-phases of the electronic public procurement process could be identified:

- **E-sourcing:** preparatory activities conducted by the contracting authority/entity to collect and reuse information for the preparation of a call; potential bidders may be contacted, if admitted by the legal rules, by electronic means to provide quotations or manifest interest.
- **E-noticing:** advertisement of calls for tenders through the publication of appropriate contract notices in electronic format in the relevant Official Journal (national/EU); electronic access to tender documents and specifications as well as additional related documents are provided in a non-discriminatory way.
- **E-access:** electronic access to tender documents and specifications as well support to economic operators for the preparation of an offer, e.g. clarifications, questions and answers.
- **E-submission:** submission of offers in electronic format to the contracting authority/entity, which is able to receive, accept and process offers in compliance with the legal requirements.
- **E-tendering:** is the combination of the e-access and e-submission phases.
- **E-awarding:** opening and evaluation of the electronic tenders received, and award of the contract to the best offer in terms of the lowest price or economically most advantageous bid.
- **E-contract:** conclusion, enactment and monitoring of a contract/agreement through electronic means between the contracting authority/entity and the winning tender.
- **E-orders:** preparation and issuing of an electronic order by the contracting authority/entity and its acceptance by the contractor.
- **E-order Status:** preparation and delivery of status information against the e-order.
- **E-invoicing:** preparation and delivery of an invoice in electronic format.
- **E-payment:** electronic payment of the ordered goods, services or works.